

# ARBED-ROLLED WIDE FLANGE BEAMS 40" STANDARD AND TAILOR-MADE SERIES

Third Edition

TRADE ARBED Canada Inc

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#### INTRODUCTION

The ARBED Group — 130 years ago, ARBED began its climb into the top ranks of the international steel industry . . .

Today, with mills in Luxembourg, West Germany, Belgium, Austria and Brazil we have a capacity approx. 15 million tons of steel annually making us the 3rd largest producer in Europe, 10th largest in the world.

This success is due to our strict standards of quality and service firmly founded on an extensive offering of both standard and derived sections. In fact, it's our ability to give you 'what you need' that makes ARBED unique. Right from the time ARBED rolled the very first wide flange beam in 1902, we've continued to provide an everincreasing array of products, among them our rolled wide flange beams, 40" standard and tailor-made series.

This impressive capability can only be outlined in this brochure indicating a sampling of thousands of possible sections available. You no longer are restricted to the standard range of wide flange beams but now also have the option of specifying ARBED rolled beams as an alternate to built up/welded sections, (Of course, ARBED does not produce welded sections, nor does it sell fabricated steel). The result? — Considerable cost savings and the possible additional benefit of reduced weight . . .

We invite you to investigate the steelworld of ARBED.

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Plasti

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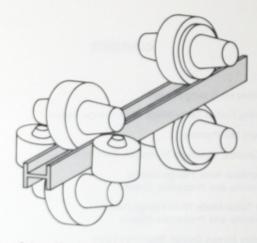
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#### THE UNIVERSAL ROLLING PRINCIPLE

The principle of 'universal' rolling which ARBED uses was developed by the Scotsman Henry Grey. The universal mill commissioned in ARBED's Differdange plant in 1902 was the first in the world to roll wide-flange beams of up to a meter height. Since then, the process has been constantly developed and improved by ARBED engineers and research staff.

Today, beams are rolled on a powerful entirely new universal mill which caters to tailor-made beams just as much as to standard beams.



Schematic representation of a group of stands

The ingots are heated to rolling temperatures in pit furnaces before going through a special blooming process where they are pre-profiled. The pre-profiled bloom is rolled into a beam on the finishing train which comprises three groups of stands — cogging, intermediate and finishing (which is also used for polishing).

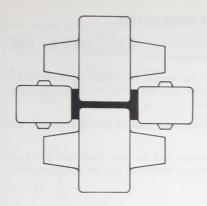
The first two groups are each comprised of a universal rolling stand and an edging stand. The two horizontal rolls in the universal stand roll the web. The vertical rolls of the universal stand roll the flanges. The two rolls in the edging stand simply edge the flanges.

The six rolls stream edge roll set mere

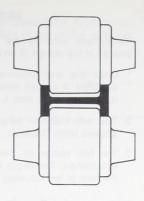
As there is a produced in within the sal

eveloped by the ED's Differdange arms of up to a developed and

which caters to



A universal stand



An edging stand

The six rolls in each stand are adjustable. The universal stand with its downstream edger can roll a whole range of derived beams without any change in the roll set merely by use of the roll adjusting gear.

As there is no need to change rolls, standard and tailor-made beams can be produced in the same rolling. Tailor-made beams can therefore be supplied within the same delivery time as standard beams.

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g stand and an oll the web. The lis in the edging

#### ARBED TAILOR-MADE BEAMS

Tailor-made sections are derived from standard sections. There are three phases in the design of an ARBED tailor-made beam:

- 1. Once the web thickness (tw) and the flange thickness (tr) have been specified, it is then established whether they fall within the tolerance limits (tw max, tw min, tf max, tf min) (Table A).
- 2. The ratio between flange and web thickness must be contained within the allowed limits (Table A).
- 3. The fillet radius (r), the flange thickness and the web thickness are thus established. The depth (d) and the flange width (bt) can be calculated with the help of the following formulae



Note that do is the distance between flanges and is determined by the width of the horizontal roll table, while bio is given by the size of the edging rolls (Table A).

TABLE A: DESIGN CRITERIA FOR TAILOR-MADE BEAMS

| Designation    | Distance<br>between<br>Flanges | Width  | Thick | eb<br>kness<br>w | Thiol | nge<br>kness<br>l <sub>r</sub> | Re    |      | Fillet<br>Radius |
|----------------|--------------------------------|--------|-------|------------------|-------|--------------------------------|-------|------|------------------|
|                | do                             | Pio    | i     |                  |       | n.                             | 14/   | lw   | 1                |
|                | in.                            | in.    | max.  | min.             | max.  | min.                           | max.  | min. | in.              |
| WTM 40 × 18    | 36.53                          | 16.900 | 1.330 | 0.710            | 2.000 | 0.830                          | 2.0   | 1.5  | 1.180            |
| WTM 40 × 16    | 36.53                          | 14.900 | 2.360 | 0.650            | 3.540 | 0.830                          | 2.2"  | 1.5  | 1.180            |
| WTM 40 × 12    | 36.53                          | 10.960 | 2.360 | 0.650            | 3.540 | 0.830                          | 2.2"  | 1.5  | 1.180            |
| WTM 36 × 161/4 | 33.39                          | 15,610 | 2.520 | 0.760            | 4.530 | 1.260                          | 2.0   | 1.5  | 0.945            |
| WTM 36 × 12    | 33.96                          | 11.250 | 2.360 | 0.600            | 3.540 | 0.790                          | 2.2"  | 1.5  | 0.752            |
| WTM 33 × 15%   | 31.38                          | 14,940 | 2.360 | 0.715            | 3.540 | 1.150                          | 2.0   | 1.5  | 0.709            |
| WTM 33 × 11%   | 31.38                          | 10.835 | 2.360 | 0.550            | 3.540 | 0.740                          | 2.2"  | 1.5  | 0.701            |
| WTM 32 × 12    | 28.90                          | 11.025 | 2.360 | 0.590            | 3.540 | 0.710                          | 2.2** | 1.5  | 1.181            |
| WTM 30 × 15    | 28.30                          | 14,230 | 2.360 | 0.655            | 3.540 | 1.065                          | 2.0   | 1.5  | 0.669            |
| WTM 30 × 10%   | 28.30                          | 9.830  | 2.360 | 0.520            | 3.540 | 0.670                          | 2.0   | 1.5  | 0.650            |
| WTM 28 × 12    | 25.04                          | 11,040 | 2.360 | 0.570            | 3.540 | 0.670                          | 2.2** | 1.5  | 1.063            |
| WTM 27 × 14    | 25.44                          | 13.290 | 2.360 | 0.605            | 3.540 | 0.975                          | 2.2** | 1.5  | 0.591            |
| WTM 27 × 10    | 25.44                          | 9.400  | 2.360 | 0.460            | 3.540 | 0.640                          | 2.0   | 1.5  | 0.598            |
| WTM 26 × 12    | 23.15                          | 11.080 | 2.360 | 0.530            | 3,540 | 0.630                          | 2.2** | 1.5  | 1.063            |
| WTM 24 × 12%   | 22.56                          | 12.145 | 2.360 | 0.500            | 3.540 | 0.750                          | 22"   | 1.5  | 0.512            |
| WTM 24 × 12    | 21.26                          | 11.100 | 2.350 | 0.510            | 3.520 | 0.610                          | 2.3   | 1.5  | 1.063            |
| WTM 24 × 9     | 22.56                          | 8.450  | 2.100 | 0.415            | 3.150 | 0.585                          | 2.0   | 1.5  | 0.500            |
| WTM 22 × 12    | 19.37                          | 11.120 | 2.100 | 0.490            | 3.150 | 0.590                          | 2.3   | 1.5  | 1.063            |
| WTM 22 × 81/2  | 20.30                          | 7.730  | 1.560 | 0.435            | 2.340 | 0.620                          | 2.0   | 1.5  | 0.945            |
| WTM 21 × 12%   | 19.76                          | 11.670 | 2.100 | 0.500            | 3.130 | 0.800                          | 2.0   | 1.5  | 0.550            |
| WTM 18 × 11    | 16.85                          | 10.490 | 1.830 | 0.425            | 2.740 | 0.680                          | 2.3   | 1.5  | 0.430            |

<sup>\*</sup> for t<sub>w</sub> less than 0.790, flange/web ratio shall not exceed 2.

The values d. values it is po help of the for A = 24b1+ (d

Cross-sect W Weight (Lb

Moment of S<sub>x</sub> Elastic sec A Radius of

Moment of S, Elastic sec Radius of g

Z Plastic sect

Torsional o 1 Radius of o flange plus axis in the

<sup>\*\*</sup> for t<sub>w</sub> less than 0.630, flange/web ratio shall not exceed 2

There are three

(t<sub>f</sub>) have been tolerance limits

tained within the

ickness are thus e calculated with

- 2 ts

d by the width of the edging rolls

ange/Web Fillet Ratio 1.180 1.5 1.181 0.591 0.598 1.5 0.500 1.063 1.5 0.945 0.550 1.5 0.430 The values d, b<sub>f</sub>, t<sub>w</sub>, t<sub>f</sub> and r define in full the section dimensions. From these values it is possible to determine the other caracteristics of the section with the help of the formulas below:

$$A = 2 t_f b_f + (d - 2 t_f) t_w + 0.8584 r^2$$

$$W = \frac{490}{144} A$$

$$I_X = \frac{1}{12} \left[ b_f d^3 - (b_f - t_w) (d - 2 t_f)^3 \right] + 0.03 r^4 + 0.2146 (d - 2 t_f - 0.4468 r)^2 r^2$$

$$S_x = \frac{2I_x}{d}$$

$$r_x = \sqrt{\frac{I_x}{A}}$$

$$I_y = \frac{1}{12} \left[ 2 t_f b_f^3 + (d - 2 t_f) t_w^3 \right] + 0.03 r^4 + 0.2146 (t_w + 0.4468 r)^2 r^2$$

$$S_y = \frac{2 \, I_y}{b_f}$$

$$r_y = \sqrt{\frac{l_y}{A}}$$

$$Z_{x} = \frac{Ad}{2} - \left[ \left. b_{f} t_{f}^{2} + t_{w} \left( d - 2t_{f} \right) \left( \frac{d}{2} - \frac{d - 2t_{f}}{4} \right) + 0.8584 r^{2} \left( t_{f} + 0.2234 r \right) \right]$$

$$Z_y = \frac{b_f^2 t_f}{2} + \frac{t_w^2 (d - 2t_f)}{4} + 0.8584 r^2 \, \left( \frac{t_w}{2} + 0.2234 r \right)$$

$$J = \frac{2(b_f - 0.63t_f)}{3} \ t_f^{\,3} + \frac{d - 2t_f}{3} t_w^{\,3} + \frac{2t_w}{t_f} \left( 0.145 + \frac{0.1r}{t_f} \right) \left( \frac{\left( \ r + \frac{t_w}{2} \right)^2 + (r + t_f)^2 - r^2}{2r + t_f} \right)^4$$

$$r_{t} = \sqrt{\frac{\frac{t_{f}b_{f}^{3} + \frac{d - 2t_{f}}{6}t_{w}^{3}}{12} + 0.0151r^{4} + 0.4292r^{2}\left(\frac{t_{w}}{2} + 0,2234r\right)^{2}}{\frac{A}{2} - t_{w}\frac{d - 2t_{f}}{3}}}$$

Cross-sectional area (sq. in.)

Weight (Lb./Ft.)

Moment of inertia of a section about the X - X axis (in.4)

Sx Elastic section modulus about the X - X axis (in.3)

Radius of gyration with respect to the X - X axis (in.)

ly Sy Moment of inertia of a section about the Y - Y axis (in.4)

Elastic section modulus about the Y - Y axis (in.3)

Radius of gyration with respect to the Y - Y axis (in.)

Plastic section modulus with respect to the X - X axis (in.3)

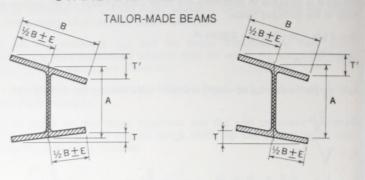
Plastic section modulus with respect to the Y - Y axis (in.3)

Torsional constant (in.4)

Radius of gyration of a section comprising the compression flange plus 1/3 of the compression web area, taken about an axis in the plane of the web (in.)



### STANDARD MILL PRACTICE



#### **ROLLING TOLERANCES**

| A, De                    | pth, in.                  | B, Fig. V                | Vidth, in.                | T + T'.                                |                                    |
|--------------------------|---------------------------|--------------------------|---------------------------|--|------------------------------------|
| Over<br>Theo-<br>retical | Under<br>Theo-<br>retical | Over<br>Theo-<br>retical | Under<br>Theo-<br>retical | Flanges,<br>Out of Square,<br>max. in. | αE. Web off<br>Center,<br>max. in. |
| 3/16                     | 3/16                      | 5/16                     | 3/16                      | 5/16                                   | 1/4                                |

α Variation of 5/16-in. max. for sections over 426 lb./ft.

#### **CUTTING TOLERANCES**

| Variations from S | pecified Length, in. |
|-------------------|----------------------|
| Over Theoretical  | Under Theoretica     |
| 4                 | 0                    |

#### OTHER TOLERANCES

| Variations in A  | Area and Weight   |
|------------------|-------------------|
| Over Theoretical | Under Theoretical |
| 5.5 %            | 2.5 %             |

| Variation in Straightness                               |  |
|---|--|
| Camber  |  |
| $1/8$ in. $\times \frac{\text{(total length, ft.)}}{7}$ |  |

Reduced tolerances are subject to negotiation.

The minimum exceeding the produce tailor sections. In negotiation.

The minimum 5 tons.

40" and tailor-

Our team of er of 40" standard for establishing for determing t

#### MINIMUM TONNAGE

The minimum tonnage required for tailor-made sections which have dimensions exceeding those of ASTM-A6 is 50 tons. It is also possible to design and produce tailor-made sections which fall between two ASTM-A6 standard sections. In this case the minimum tonnage requirement is subject to negotiation.

The minimum tonnage requirements applicable to the 40" standard beams is 5 tons.

#### STEEL GRADES

40" and tailor-made wide flange beams can be provided in accordance to the following ASTM grades:

A 36

E. Web off

Center, max. in.

1/4

A 441

A 572-42

A 572-50

A 572-60 (40" standard sections only)

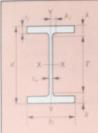
A 242

A 588

#### **TECHNICAL ADVICE**

Our team of engineers is available to assist with the specification and application of 40" standard or tailor-made beams. ARBED computer programs are available for establishing the best tailor-made section on the basis of given static values, or for determing the static values of a derived section.



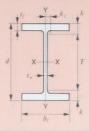


### 40" WIDE FLANGE BEAMS

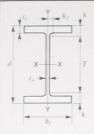
#### Dimensions

|   |         |   |  | -  | -th  |  | Web  |   |  | Flar   | nge  |   | -                                | Distance   | 0  | 1077-                           | 0                                | Cri  | t Section teria                              |
|---|---------|---|--|--|--|--|--|---|--|--|--|---|----------------------------------|--|--|---------------------------------|----------------------------------|------|--|
|   | Designa | tion                                    | Area   |  | pth<br>d   | Thicks   |  | $\frac{t_w}{2}$                         | Wid  |  | Thickr   |   | T                                | k  | k <sub>1</sub>   | M. per                          | bj 21/                           | Fy   | $\frac{d}{l_w}$                              |
|   |         |   | In.2   | In.  | In.  | In.  | In.  | In.                                     | In.  | In.  | ln.  | In.   | In.                              | In.  | In.  | .0.                             |                                  | Ksi  |  |
| W | 40X18   | X328<br>298<br>268<br>244<br>221<br>192 | 96.4<br>87.6<br>78.8<br>71.7<br>64.8<br>56.5 | 40.00<br>39.69<br>39.37<br>39.06<br>38.67<br>38.20 | 40<br>39 <sup>3</sup> / <sub>4</sub><br>39 <sup>3</sup> / <sub>8</sub><br>39<br>38 <sup>5</sup> / <sub>8</sub><br>38 <sup>1</sup> / <sub>4</sub> | 0.910<br>0.830<br>0.750<br>0.710<br>0.710<br>0.710 | 15/16<br>13/16<br>3/4<br>11/16<br>11/16<br>11/16 | 7/16<br>3/8<br>3/8<br>3/8<br>3/8<br>3/8 | 17.910<br>17.830<br>17.750<br>17.710<br>17.710<br>17.710 | 177/8<br>177/8<br>173/4<br>173/4<br>173/4<br>173/4 | 1.730<br>1.575<br>1.415<br>1.260<br>1.065<br>0.830 | 11/ <sub>4</sub><br>11/ <sub>16</sub><br>13/ <sub>16</sub>          |                                  | 3<br>2 <sup>13</sup> / <sub>16</sub><br>2 <sup>5</sup> / <sub>8</sub><br>2 <sup>7</sup> / <sub>16</sub><br>2 <sup>1</sup> / <sub>4</sub> | 111/1<br>15/8<br>19/16<br>19/16<br>19/16<br>19/16<br>15/8                        | 298<br>268<br>244<br>221<br>192 | 5.7<br>6.3<br>7.0<br>8.3<br>10.7 | 61.1 | 44.0<br>47.8<br>52.5<br>55.0<br>54.5<br>53.8 |
| W | 4UX 16  | X277<br>249<br>215<br>199<br>174        | 73.3<br>63.3<br>58.4<br>51.0                 | 39.38<br>38.98<br>38.67<br>38.20                   | 393/8<br>39<br>386/8<br>381/4  | 0.650<br>0.650<br>0.650                            | 3/4<br>5/8<br>5/8<br>5/8                         | 3/8<br>5/16<br>5/16<br>5/16             | 15.750<br>15.750<br>15.750<br>15.750                     | 153/4<br>153/4<br>153/4<br>153/4<br>153/4          | 1.420<br>1.220<br>1.065<br>0.830                   | 17/16<br>11/ <sub>4</sub><br>11/ <sub>16</sub><br>13/ <sub>16</sub> | 333/4<br>333/4<br>333/4<br>333/4 | 2 <sup>13</sup> / <sub>16</sub><br>2 <sup>5</sup> / <sub>8</sub><br>2 <sup>7</sup> / <sub>16</sub><br>2 <sup>1</sup> / <sub>4</sub>      | 19/ <sub>16</sub><br>19/ <sub>16</sub><br>19/ <sub>36</sub><br>19/ <sub>36</sub> | 249<br>215<br>199<br>174        | 5.5<br>6.5<br>7.4<br>9.5         | 46.9 | 52.5<br>60.0<br>59.5                         |
| W | 40X12   | X235<br>211<br>183<br>167<br>149        | 68.9<br>62.0<br>53.7<br>49.1<br>43.8         | 39.69<br>39.37<br>38.98<br>38.59<br>38.20          | 39 <sup>3</sup> / <sub>4</sub><br>39 <sup>3</sup> / <sub>8</sub><br>39<br>38 <sup>5</sup> / <sub>8</sub><br>38 <sup>1</sup> / <sub>4</sub>       | 0.830<br>0.750<br>0.650<br>0.650<br>0.630          | 13/16<br>3/4<br>5/8<br>5/8<br>5/8                | 7/16<br>3/8<br>5/16<br>5/16<br>5/16     | 11.890<br>11.810<br>11.810<br>11.810<br>11.810           | 117/8<br>113/4<br>113/4<br>113/4<br>113/4          | 1.575<br>1.415<br>1.220<br>1.025<br>0.830          | 17/16<br>11/4<br>1  | 333/4                            | 213/16<br>25/8<br>27/16  | 19/1/  | 211<br>163<br>167               | 42<br>48<br>58                   |      | 47.8<br>52.5<br>60.0<br>59.4<br>60.6         |

# 40" WIDE FLANGE BEAMS Properties



|  |   | Di  | stance   |                    |         | m-   | C   |                | t Secti<br>teria   | on   |  |  |   | E  | lastic-P   | ropertie   | S   |  | Tor-<br>sional-  |   | astic<br>dulus   |
|--|---|---|--|--------------------|---------|--|---|----------------|--|--|--|--|---|--|--|--|---|--|--|---|--|
| ness   | 7   |   | 1  |                    |         | t.   | -   | E'             | d  | $F_y'''$   | rT   | $\frac{d}{A_f}$  | ,   | Axis X-X   |  |  | Axis Y-Y  | 1  | con  | $Z_x$   | Z <sub>v</sub>   |
|  | Í   |   | K .  | 4                  | ľ       |  | $\frac{b_f}{2t_f}$  | Fy             | $\frac{a}{t_w}$  | ry   |  | Af   | I   | S  | r  | I  | S   | r  | J  | Zx  | Ly   |
| ln.  | ln.   |   | In.  | 100                | ı       | ).   |   | Ksi            | w  | Ksi  | In.  |  | In.4  | In.3   | In.  | In.4   | In.3  | In.  | In.4   | In.3  | In.3   |
| 19/16<br>17/16<br>11/4<br>11/16<br>13/18<br>19/16<br>17/16<br>11/4 | 333<br>333<br>333<br>333<br>333<br>333<br>333<br>333<br>333<br>33 | \$\begin{align*} \begin{align*} \begi | 3<br>213/16<br>25/8<br>27/16<br>3<br>3<br>213/16<br>25/8<br>27/16<br>3<br>3<br>213/16<br>25/8<br>27/16 | the this this this | 7411977 | 28<br>98<br>88<br>88<br>44<br>21<br>92<br>77<br>49<br>15<br>99<br>74<br>335<br>11<br>333<br>67<br>49 | 5.2<br>5.7<br>6.3<br>7.0<br>8.3<br>10.7<br>5.0<br>5.5<br>6.5<br>7.4<br>9.5<br>3.8<br>4.2<br>4.8<br>5.8<br>7.1 | 61.1 37.1 46.9 | 44.0<br>47.8<br>52.5<br>55.0<br>54.5<br>53.8<br>47.8<br>52.5<br>60.0<br>59.5<br>58.8<br>47.8<br>60.0<br>59.5<br>60.0<br>59.5<br>60.0<br>60.6 | 34,2<br>28,9<br>24,0<br>21,8<br>22,3<br>22,8<br>24,0<br>18,4<br>18,7<br>19,1<br>28,9<br>24,0<br>18,4<br>18,7<br>18,0 | 4.73<br>4.70<br>4.67<br>4.63<br>4.56<br>4.43<br>4.10<br>4.09<br>4.04<br>3.92<br>3.01<br>2.99<br>2.98<br>2.91<br>2.84 | 1,29<br>1,41<br>1,57<br>1,75<br>2,05<br>2,60<br>1,59<br>1,76<br>2,03<br>2,31<br>2,92<br>2,12<br>2,36<br>2,71<br>3,19<br>3,90 | 26800<br>24200<br>24200<br>21500<br>19200<br>16600<br>13500<br>21900<br>16700<br>14900<br>12100<br>17400<br>15500<br>13300<br>11600<br>9780 | 1340<br>1220<br>1090<br>983<br>858<br>708<br>1100<br>992<br>858<br>769<br>636<br>874<br>785<br>682<br>599<br>512 | 16.7<br>16.6<br>16.5<br>16.4<br>16.0<br>15.5<br>16.4<br>16.2<br>16.0<br>15.4<br>15.9<br>15.8<br>15.7<br>15.3<br>14.9 | 1660<br>1490<br>1320<br>1170<br>988<br>770<br>1040<br>926<br>695<br>542<br>444<br>390<br>336<br>283<br>229 | 185<br>167<br>149<br>132<br>112<br>87.0<br>138<br>101<br>88.2<br>68.8<br>74.6<br>66.1<br>56.9<br>47.9<br>38.8 | 4.15<br>4.12<br>4.09<br>4.04<br>3.90<br>3.58<br>3.56<br>3.54<br>3.45<br>3.26<br>2.51<br>2.50<br>2.40<br>2.29 | 74.2<br>56.3<br>41.1<br>30.4<br>21.2<br>13.7<br>51.1<br>37.7<br>24.4<br>18.1<br>11.6<br>40.8<br>29.9<br>19.6<br>14.0<br>9.62 | 1510<br>1370<br>1220<br>1100<br>967<br>807<br>1250<br>11250<br>11250<br>11250<br>11250<br>963<br>868<br>726<br>1010<br>905<br>781<br>692<br>597 | 286<br>257<br>229<br>203<br>172<br>135<br>204<br>182<br>156<br>137<br>107<br>118<br>89,9<br>76.0<br>62.2 |
|  |   |   |  |                    |         | 以 · · · · · · · · · · · · · · · · · · ·  |   |                |  |  |  |  |   |  |  |  |   |  |  |   |  |



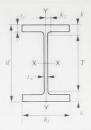
# TAILOR-MADE WIDE FLANGE BEAMS Dimensions

TA

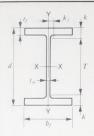
|              |       | Area  | De    | pth   |       | Web    |                 |        | Fla   | nge    |        |       | Distanc | е    | Nom-<br>inal      |        | Cr             | riteria         |
|--------------|-------|-------|-------|-------|-------|--------|-----------------|--------|-------|--------|--------|-------|---------|------|-------------------|--------|----------------|-----------------|
| Designat     | ion   | A     |       | d     | Thick |        | $\frac{t_w}{2}$ | Widt   |       | Thickn |        | T     | k       | k.   | Wt.<br>per<br>Ft. | 61 211 | F <sub>y</sub> | $\frac{d}{l_w}$ |
|              |       | In.2  | In.   | In.   | In.   | In.    | In.             | In.    | In.   | In.    | In.    | In.   | In.     | In   | Lb.               | ,      | Ksi            |                 |
| WTM 40X16    | X 655 | 192.0 | 43.62 | 435/8 | 1.970 | 2      | 1               | 16.870 | 167/8 | 3.540  | 39/16  | 333/4 | 415/16  | 21/4 | 655               |        |                | 22.1            |
|              | 593   | 174.0 | 42.99 | 43    | 1.790 | 113/16 | 1               | 16.690 | 163/4 |        | 31/4   | 333/4 | 45/8    | 21/5 | 593               | 2.6    | -              | 24.0            |
|              | 531   | 156.0 | 42.34 | 423/8 | 1.610 | 15/8   | 13/16           |        | 161/2 |        |        | 333/4 | 45/16   | 2    | 531               | 2.8    |                | 26.3            |
|              | 480   | 140.0 | 41.81 | 413/4 | 1.460 | 17/16  | 3/4             | 16.360 | 163/8 | 2.640  | 25/8   | 333/4 | 4       | 2    | 480               | 3.1    |                | 28.6            |
|              | 436   | 128.0 | 41.34 | 413/8 | 1.340 | 15/16  | 11/16           |        | 161/4 | 2.400  | 23/8   | 333/4 | 313/16  | 115  | 436               | 3.4    |                | 30.9            |
|              | 397   | 116.0 | 40.95 | 41    | 1.220 | 11/4   | 5/8             | 16.120 | 161/8 |        | 23/16  | 333/4 | 35/8    | 17/1 | 397               | 3.7    | -              | 33.6            |
|              | 362   | 106.0 | 40.55 | 401/2 | 1.120 | 11/8   | 9/16            | 16.020 | 16    | 2.010  | 2      | 333/4 | 33/8    | 113  | 362               | 4.0    | -              | 36.2            |
|              | 324   | 95.3  | 40.16 | 401/8 | 1.000 | 1      | 1/2             | 15.905 | 157/8 |        | 113/16 |       | 33/16   | 13/  | 324               | 4.4    |                | 40.2            |
|              | 297   | 87.4  | 39.84 | 397/8 | 0.930 |        | 1/2             | 15.825 | 157/8 | 1.650  | 15/8   | 333/4 | 31/16   | 111  | 297               | 4.8    |                | 42.8            |
| WTM 40X 12   | X561  | 164.0 | 43.62 | 435/8 | 1.970 | 2      | 1               | 12.930 | 127/8 | 3.540  | 39/16  | 333/4 | 415/16  | 21/  | 561               | 1.8    |                | 22.1            |
|              | 520   | 152.0 | 43.15 | 431/8 | 1.830 | 113/16 | 1               | 12.790 | 123/4 | 3.310  | 35/16  | 333/4 | 411/16  |      | 520               |        |                | 23.6            |
|              | 475   | 139.0 | 42.60 | 425/8 | 1.690 | 111/16 |                 | 12.660 | 125/8 | 3.030  | 3      | 333/4 | 47/16   | 21/  | 475               | 2.1    |                | 25.2            |
|              | 437   | 128.0 | 42.13 | 421/8 | 1.560 | 19/16  | 13/16           | 12.520 | 121/2 | 2.800  | 213/16 |       | 43/16   | 2    | 437               | 2.2    |                | 27.0            |
|              | 396   | 116.0 | 41.65 | 415/8 | 1.420 | 17/16  | 3/4             | 12.380 | 123/8 | 2.560  | 29/16  | 333/4 | 4       | 115  | 396               | - 2.4  | -              | 29.3            |
|              | 359   | 105.0 | 41.18 | 411/8 | 1.300 | 15/16  | 11/16           |        | 121/4 | 2.320  | 25/16  | 333/4 | 311/16  | 17/  | 359               | 2.6    |                | 31.7            |
|              | 327   | 96.0  | 40.79 | 403/4 | 1.180 | 13/16  | 5/8             | 12.145 | 121/8 | 2.130  | 21/8   | 333/4 | 31/2 -  | 113  | 327               | 29     |                | 34.6            |
|              | 294   | 86.3  | 40.39 | 403/8 | 1.060 | 11/16  | 9/16            | 12.025 | 12    | 1.930  | 115/16 |       | 35/16   | 13/  | 294               | 3.1    |                | 38.1            |
|              | 264   | 77.6  | 40.00 | 40    | 0.960 | 1      | 1/2             | 11.930 | 117/8 | 1.730  | 13/4   | 333/4 | 31/8    | 13/  | 264               | 3.4    |                | 41.7            |
| WTM 36X 16.5 | X848  | 249.0 | 42.45 | 421/2 | 2.520 | 21/2   | 11/4            | 18.130 | 181/8 | 4.530  | 41/2   | 311/8 | 511/16  | 21/  | 848               | 2.0    |                | 16.8            |
|              | 798   | 234.0 | 41.97 | 42    | 2.380 | 23/8   | 13/16           | 17.990 | 18    | 4.290  | 45/16  | 311/8 | 57/16   | 23/  | 798               | 2.1    | -              | 17.6            |
|              | 720   | 211.0 | 41.19 | 411/4 | 2.165 | 23/16  | 1 1/8           | 17.775 | 173/4 | 3.900  | 37/8   | 311/8 | 51/16   | 21/  | 720               | 2.3    |                | 19.0            |
|              | 650   | 190.0 | 40.47 | 401/2 | 1.970 | 2      | 1               | 17.575 | 175/8 | 3.540  | 39/16  | 311/8 | 411/16  | 2    | 650               | 2.5    |                | 20.5            |
|              | 588   | 172.0 | 39.84 | 397/8 | 1.790 | 113/16 | 1               | 17.400 | 173/8 | 3.230  | 31/4   | 311/8 | 43/8    | 17/  | 588               | 2.7    |                | 22.3            |
|              | 527   | 154.0 | 39.21 | 391/4 | 1.610 | 15/8   | 13/16           |        | 171/4 | 2.910  | 215/16 |       | 41/16   | 13/  | 527               | 3.0    |                | 24.4            |
|              | 485   | 142.0 | 38.74 | 383/4 | 1.500 | 11/2   | 3/4             | 17.105 | 171/8 | 2.680  |        | 311/8 | 313/16  | 13/  | 485               |        |                | 25.8            |
|              | 439   | 128.0 | 38.26 | 381/4 | 1.360 | 13/8   | 11/16           | 16.965 | 17    | 2.440  | 27/16  | 311/8 | 39/16   | 15/  | 439               | 3.5    |                | 28.1            |
|              | 393   | 115.0 | 37.80 | 373/4 | 1.220 | 11/4   | 5/8             | 16.830 | 167/8 | 2.200  | 23/16  | 311/8 | 35/16   | 15/  | 393               | 3.8    |                | 31.0            |
|              | 359   | 105.0 | 37.40 | 373/8 | 1.120 | 11/8   | 9/16            | 16.730 | 163/4 | 2.010  | 2      | 311/8 | 31/8    | 19/  | 359               | 4.2    |                | 33.4            |
|              | 328   | 96.4  | 37.09 | 371/8 | 1.020 | 1      | 1/2             | 16.630 | 165/8 | 1.850  | 17/8   | 311/8 | 3       | 11/  | 328               | 4.5    |                | 36.4            |
| WTM 36X 12   | X548  | 161.0 | 41.06 | 41    | 1.970 | 2      | 1               | 13.220 | 131/4 | 3.540  | 39/16  | 321/8 | 47/16   | 1111 | 548               | 1.9    |                | 20.8            |
|              | 508   | 149.0 | 40.58 | 405/8 | 1.830 | 113/16 | 1               | 13.080 | 131/8 | 3.310  | 35/16  | 321/8 | 41/4    | 13   | 508               | 2.0    |                | 22.2            |
|              | 464   | 136.0 | 40.03 | 40    | 1.690 | 111/16 | 7/8             | 12.940 | 13    | 3.030  | 3      | 321/8 | 4       | 11   | 464               | 2.1    |                | 23.7            |
|              | 426   | 125.0 | 39.56 | 391/2 | 1.560 | 19/16  | 13/16           | 12.810 | 123/4 | 2.800  | 213/16 |       | 311/16  | 15   | 426               | 23     |                |                 |
|              | 387   | 113.0 | 39.09 | 391/8 | 1.420 | 17/16  | 3/4             | 12.670 | 125/8 | 2.560  | 29/16  | 321/8 | 31/2    | 11.  | 357               | 25     |                | 25.4            |
|              | 350   | 102.0 | 38.61 | 385/8 | 1.300 | 15/16  | 11/16           | 12.550 | 121/2 | 2.320  | 25/16  | 321/8 | 31/4    | 17   | 350               | 2.7    |                |                 |
|              | 318   | 93.5  | 38.22 | 381/4 | 1.180 | 13/16  | 5/8             | 12.430 | 123/8 | 2.130  | 21/8   | 321/8 | 31/16   | 13   | 318               | 2.9    |                | 29.7            |
|              | 286   | 84.0  | 37.83 | 377/8 | 1.060 | 11/16  | 9/16            | 12.315 | 123/8 | 1.930  | 115/16 |       | 27/8    | 13   | 26                | 32     |                | 32.4            |
|              | 256   | 75.4  | 37.43 | 373/8 | 0.960 | 1      | 1/2             | 12.215 | 121/4 | 1.730  | 13/4   | 321/8 | 25/8    | 15   | 26                | 3.5    |                | 35.7            |
|              | 232   | 68.1  | 37.12 | 371/8 | 0.870 | 7/8    | 7/16            | 12.120 | 121/8 | 1.570  | 19/16  | 321/8 | 21/2    | 11   | 20                | 3.9    |                | 39.0            |
|              |       |       |       |       |       |        |                 |        |       |        |        |       |         | 3    |                   |        |                | 42.7            |
|              |       |       |       |       |       |        |                 |        |       |        |        |       |         | 1    |                   |        |                |                 |
|              |       |       |       | -     |       |        |                 |        |       |        |        |       |         |      | -                 |        |                |                 |

BEAMS

# TAILOR-MADE WIDE FLANGE BEAMS Properties



|        |                | Distanc      | 8      | om-<br>nal | Co                 |         | t Secti<br>teria | on       |      |                 |       | E       | lastic-Pr | ropertie | S        |      | Tor-<br>sional- |      | stic<br>dulus |
|--------|----------------|--------------|--------|------------|--------------------|---------|------------------|----------|------|-----------------|-------|---------|-----------|----------|----------|------|-----------------|------|---------------|
| ess    | T              |              |        | Vt.        | ,                  | E'      | ,                | E        | rT.  | $\frac{d}{A_f}$ | A     | xis X-X |           | 1        | Axis Y-Y |      | con             | Z,   | Z.            |
|        | 1              | k            | 4      | ₹t.        | $\frac{b_f}{2t_f}$ | $F_{y}$ | $\frac{d}{t_w}$  | $F_y'''$ |      | Af              | I     | S       | r         | I        | S        | r    | J               | -x   | -             |
| ln.    | ln.            | ln.          | h      | .b.        |                    | Ksi     |                  | Ksi      | ln.  |                 | In.4  | In.3    | ln.       | In.4     | In.3     | In.  | In.4            | In.3 | In.           |
| 39/16  | 333/4          | 415/16       | 21.    | 355        | 2.4                | -       | 22.1             | -        | 4.43 | 0.73            | 56500 | 2590    | 17.2      | 2860     | 339      | 3.86 | 596             | 3060 | 541           |
| 31/4   | 333/4          |              | 211    | 593        | 2.6                | -       | 24.0             | -        | 4.38 | 0.80            | 50400 | 2340    | 17.0      | 2520     | 302      | 3.81 | 451             | 2750 | 481           |
| 215/16 |                | 45/16        |        | 531        | 2.8                | -       | 26.3             | -        | 4.33 | 0.88            | 44300 | 2090    | 16.9      | 2200     | 266      | 3.75 | 329             | 2450 | 422           |
| 25/8   | 333/4          |              | 2      | 480        | 3.1                | -       | 28.6             | -        | 4.28 | 0.97            | 39500 | 1890    | 16.8      | 1940     | 237      | 3.72 | 245             | 2180 | 374           |
| 23/8   |                | 313/16       |        | 436        | 3.4                | -       | 30.9             | -        | 4.24 | 1.06            | 35400 | 1710    | 16.6      | 1720     | 212      | 3.67 | 186             | 1980 | 334           |
| 23/16  | 333/4          |              |        | 397        | 3.7                | -       | 33.6             | 58.6     | 4.21 | 1.15            | 32000 | 1560    | 16.6      | 1540     | 191      | 3.65 | 142             | 1790 | 300           |
| 2 16   |                |              |        | 362        | 4.0                |         | 36.2             | 50.4     | 4.17 | 1.26            | 28900 | 1420    | 16.5      | 1380     | 173      | 3.61 | 109             | 1630 | 270           |
|        | 333/4          |              | 100    | 324        | 4.4                | 1       | 40.2             | 41.0     | 4.14 | 1.40            | 25600 | 1280    | 16.4      | 1220     | 153      | 3.57 | 79.4            | 1460 | 239           |
| 15/8   | 333/4          | 31/16        | 174    | 297        | 4.8                | - 1     | 42.8             | 36.0     | 4.11 | 1.53            | 23200 | 1170    | 16.3      | 1090     | 138      | 3.54 | 61.2            | 1330 | 215           |
| 39/16  | 333/           | 415/16       | 20.    | 561        | 1.8                | -       | 22.1             | -        | 3.32 | 0.95            | 45300 | 2080    | 16.6      | 1300     | 201      | 2.82 | 480             | 2500 | 333           |
| 35/16  |                | 411/18       |        | 520        | 1.9                | -       | 23.6             | -        | 3.28 | 1.02            | 41500 | 1920    | 16.5      | 1170     | 184      | 2.78 | 389             | 2300 | 303           |
| 3-116  |                | 47/16        |        | 475        | 2.1                | -       | 25.2             | -        | 3.24 | 1.11            | 37300 | 1750    | 16.4      | 1040     | 164      | 2.74 | 301             | 2090 | 270           |
|        | 333/4          |              | 2      | 437        | 2.2                | -       | 27.0             | -        | 3.19 | 1.20            | 33900 | 1610    | 16.3      | 929      | 148      | 2.69 | 237             | 1910 | 243           |
|        | 333/4          |              | 115    | 396        | 2.4                | -       | 29.3             | -        | 3.15 | 1.31            | 30400 | 1460    | 16.2      | 819      | 132      | 2.66 | 180             | 1720 | 216           |
| 29/16  |                |              |        | 359        | 2.6                | -       | 31.7             | -        | 3.11 | 1.45            | 27200 | 1320    | 16.1      | 720      | 118      | 2.62 | 135             | 1550 | 191           |
| 25/16  |                | 311/16       |        | 327        | 2.9                | -       | 34.6             | 55.3     | 3.08 | 1.58            | 24500 | 1200    | 16.0      | 642      | 106      | 2.59 | 104             | 1420 | 17            |
| 21/8   | 333/4          | 31/2         |        | 294        | 3.1                | -       | 38.1             | 45.5     | 3.05 | 1.74            | 21900 | 1080    | 15.9      | 564      | 93.8     | 2.56 | 76.8            | 1270 | 151           |
| 115/16 | 333/4          |              | 1%     | 264        | 3.4                | -       | 41.7             | 38.0     | 3.01 | 1.94            | 19400 | 971     | 15.8      | 493      | 82.6     | 2.52 | 56.1            | 1130 | 132           |
|        |                | F44/         | 251    | 848        | 2.0                | -       | 16.8             | -        | 4.84 | 0.52            | 67400 | 3170    | 16.4      | 4550     | 501      | 4.27 | 1270            | 3830 | 799           |
| 41/2   |                | 511/16       | 29/1   | 798        | 2.1                | -       | 17.6             | -        | 4.80 | 0.54            | 62600 | 2980    | 16.4      | 4200     | 467      | 4.24 | 1070            | 3570 | 743           |
| 45/16  | 311/8          |              |        | 720        | 2.3                | -       | 19.0             | -        | 4.73 | 0.59            | 55300 | 2690    | 16.2      | 3680     | 414      | 4.18 | 804             | 3190 | 656           |
| 37/8   | 311/8          | 51/16        | 21/16  | 650        | 2.5                | -       | 20.5             | -        | 4.67 | 0.65            | 48900 | 2420    | 16.0      | 3230     | 367      | 4.12 | 600             | 2840 | 580           |
| 39/16  | 311/8          |              | 2      | 588        | 2.7                | -       | 22.3             | -        | 4.62 | 0.71            | 43500 | 2180    | 15.9      | 2850     | 328      | 4.07 | 453             | 2550 | 517           |
| 31/4   | 311/8          |              |        | 527        | 3.0                | -       | 24.4             | -        | 4.57 | 0.78            | 38300 | 1950    | 15.8      | 2490     | 289      | 4.02 | 330             | 2270 | 454           |
| 215/16 | 311/8          | 41/16        |        | 485        | 3.2                | -       | 25.8             | _        | 4.53 | 0.85            | 34700 | 1790    | 15.6      | 2250     | 263      | 3.98 | 260             | 2070 | 412           |
| 211/16 | 311/8          | 313/16       |        | 439        | 3.5                | -       | 28.1             | -        | 4.49 | 0.92            | 31000 | 1620    | 15.6      | 1990     | 235      | 3.95 | 195             | 1860 | 367           |
| 27/16  | 311/8          | 39/16        | 19/8   | 393        | 3.8                | -       | 31.0             | -        | 4.45 | 1.02            | 27500 | 1450    | 15.5      | 1750     | 208      | 3.90 | 143             | 1660 | 325           |
| 23/16  | 311/8          | 35/16        |        | 359        | 4.2                | -       | 33.4             | 59.2     | 4.42 | 1.11            | 24800 | 1320    | 15.4      | 1570     | 188      | 3.87 | 109             | 1510 | 292           |
| 2 17/8 | 311/8<br>311/8 | 31/8         | 19/16  | 328        | 4.5                | -       | 36.4             | 50.0     | 4.39 | 1.21            | 22500 | 1210    | 15.3      | 1420     | 171      | 3.84 | 84.5            | 1380 | 265           |
| 170    |                |              | 113/16 | 548        | 1.9                | -       | 20.8             | -        | 3.43 | 0.88            | 39600 | 1930    | 15.7      | 1390     | 210      | 2.93 | 466             | 2330 | 343           |
| 39/16  | 321/8          | 47/16        | 13/4   | 508        | 2.0                | -       | 22.2             | -        | 3.39 | 0.94            | 36300 | 1790    | 15.6      | 1250     | 192      | 2.90 | 378             | 2140 | 312           |
| 35/16  | 321/8          |              | 111/11 | 464        | 2.1                | -       | 23.7             | -        | 3.35 | 1.02            | 32600 | 1630    | 15.5      | 1110     | 171      | 2.85 | 291             | 1940 | 278           |
| 3      | 321/8          | 4            |        | 426        | 2.3                | -       | 25.4             | -        | 3.31 | 1.10            | 29500 | 1490    | 15.4      | 992      | 155      | 2.82 | 229             | 1770 | 25            |
| 213/16 | 321/8          | 311/16       | 41/4   | 387        | 2.5                | -       | 27.5             | -        | 3.27 | 1.21            | 26500 | 1350    | 15.3      | 876      | 138      | 2.78 | 174             | 1590 | 223           |
| 29/16  | 321/8          | 31/2         | 47/4   | 350        | 2.7                | -       | 29.7             | -        | 3.23 | 1.33            | 23600 | 1220    | 15.2      | 771      | 123      | 2.75 | 130             | 1420 | 197           |
| 25/16  | 321/8          | 31/4         | 13/2   | 318        | 2.9                | -       | 32.4             | 63.0     | 3.20 | 1.44            | 21300 | 1110    | 15.1      | 687      | 110      | 2.71 | 99.5            | 1300 | 17            |
| 21/8   | 321/8          | 31/16        | 451    | 286        | 3.2                | -       | 35.7             | 51.9     | 3.17 | 1.59            | 18900 | 1000    | 15.0      | 604      | 98.2     | 2.68 | 73.5            | 1170 | 156           |
| 115/16 | 321/8          | 27/8         | 1918   | 256        | 3.5                | -       | 39.0             | 43.4     | 3.13 | 1.77            | 16800 | 895     | 14.9      | 528      | 86.5     | 2.65 | 53.3            | 1040 | 137           |
| 13/4   | 321/8          | 25/8<br>21/2 | 15/16  | 232        | 3.9                | -       | 42.7             | 36.3     | 3.11 | 1.95            | 15000 | 809     | 14.8      | 468      | 77.2     | 2.62 | 39.8            | 936  | 122           |



## TAILOR-MADE WIDE FLANGE BEAMS Dimensions

TA

Compact Se Criteria

Ksi

2.4 - 19.0 2.8 - 22.0 3.0 - 24.0 3.3 - 26.0 3.9 - 30.0 4.2 - 33.0 4.6 - 36.0 5.0 - 39.0

18 - 193 19 - 21,1 21 - 22,0 22 - 24,0 26 - 27,7 28 - 30,2 31 - 36,3 37 - 39,7 40 - 42,3 43 - 45,4 47 - 50,5

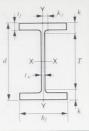
18 - 18.3 2.0 - 19.7 2.1 - 21.3 2.3 - 22.8 2.5 - 24.8 2.7 - 26.9 3.0 - 28.9

3.3 - 32.0 3.5 - 34.3

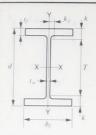
| Designation         | Area<br>A |       | pth<br>d |       |        | 1               |        |   |        |                                       |  |   |      |
|---------------------|-----------|-------|----------|-------|--------|-----------------|--------|---|--------|---------------------------------------|--|---|------|
| Designation         | 71        |       |          | Think | ness   |                 | Wid    | th  | Thickr |                                       |  |   |      |
|                     |           |       |          |       | w      | $\frac{t_w}{2}$ | b      |   | tf     |                                       | T  | k   | k.   |
|                     | In.2      | In.   | In.      | In.   | In.    | In.             | In.    | In.   | In.    | In.                                   | In.  | In.   | In   |
| VTM 33X 15.75 X 619 | 181.0     | 38.47 | 381/2    | 1.970 | 2      | 1               | 16.910 | 167/8   | 3.540  | 39/16                                 | 293/4  | 42/   | 13/4 |
| 567                 | 166.0     | 37.91 | 377/8    | 1.810 | 113/16 |                 | 16.750 | 163/4   |        | 31/4                                  | 293/4  | 43/8  |      |
| 515                 |           | 37.36 | 373/8    | 1.650 | 15/8   | 13/16           | 16.750 |   | 3.270  |                                       |  | 41/16   | 111, |
| 468                 | 137.0     | 36.81 | 363/4    | 1.520 | 11/2   | 3/4             |        | 165/8   | 2.990  | 3                                     | 293/4  | 313/16  |      |
| 424                 |           | 36.34 | 363/8    |       |        |                 | 16.455 | 161/2   | 2.720  | 23/4                                  | 293/4  | 31/2  | 19/  |
| 387                 | 113.0     | 35.95 | 36       | 1.380 | 13/8   | 11/16           | 16.315 | 163/8   | 2.480  | 21/2                                  | 293/4  | 35/16   | 17/  |
| 354                 | 104.0     | 35.55 |          | 1.260 | 11/4   | 5/8             | 16.200 | 161/4   | 2.280  | 21/4                                  | 293/4  | 31/8  | 13/1 |
| 318                 | 93.5      |       | 351/2    | 1.160 | 13/16  | 5/8             | 16.100 | 161/8   | 2.090  | 21/16                                 | 293/4  | 27/8  | 13/1 |
|                     |           | 35.16 | 351/8    | 1.040 | 11/16  | 9/16            | 15.985 | 16  | 1.890  | 17/8                                  | 293/4  | 211/16  | 15/  |
| 291                 | 85.6      | 34.84 | 347/8    | 0.960 | 1      | 1/2             | 15.905 | 157/8   | 1.730  | 13/4                                  | 293/4  | 29/16   | 11/. |
| 263                 | 77.4      | 34.53 | 341/2    | 0.870 | 7/8    | 7/16            | 15.805 | 153/4   | 1.570  | 19/16                                 | 293/4  | 23/8  | 13/  |
| TM 33X 11.5 X520    | 152.0     | 38.47 | 381/2    | 1.970 | 2      | 1               | 12.800 | 123/4   | 3.540  | 39/16                                 | 293/4  | 43/8  | 13/  |
| 476                 | 139.0     | 37.92 | 377/8    | 1.810 | 113/16 |                 | 12.645 | 125/8   | 3.270  | 31/4                                  | 293/4  | 41/16   | 111  |
| 432                 | 126.0     | 37.37 | 373/8    | 1.650 | 15/8   | 13/16           | 12.485 | 121/2   | 2.990  | 3                                     | 293/4  | 313/16  | 19/  |
| 398                 | 117.0     | 36.89 | 367/8    | 1.540 | 19/16  | 13/16           | 12.370 | 123/8   | 2.760  | 23/4                                  | 293/4  | 39/16   | 19/  |
| 361                 | 105.0     | 36.42 | 363/8    | 1.400 | 13/8   | 11/16           | 12.230 | 121/4   | 2.520  | 21/2                                  | 293/4  | 35/16   | 17/  |
| 332                 | 97.5      | 36.03 | 36       | 1.300 | 15/16  | 11/16           | 12.130 | 121/8   | 2.320  | 25/16                                 | 293/4  | 31/8  | 17/  |
| 302                 | 88.6      | 35.63 | 355/8    | 1.180 | 13/16  | 5/8             | 12.015 | 12 /8   | 2.130  | 21/8                                  | 293/4  | 3 :   | 13/  |
| 271                 | 79.6      | 35.24 | 351/4    | 1.060 | 11/16  | 9/16            | 11.895 | 117/8   | 1.930  | 115/16                                |  |   | 15/  |
| 243                 | 71.4      | 34.85 | 347/8    | 0.960 | 1      | 1/2             | 11.800 | 113/4   | 1.730  | 13/4                                  | 293/4  | 23/4  | 11/  |
| 219                 | 64.5      | 34.53 | 341/2    | 0.870 | 7/8    | 7/16            | 11.700 | 113/4   | 1.570  |                                       | 293/4  | 29/16   | 13/  |
| 204                 | 59.8      | 34.30 | 341/4    | 0.810 | 13/16  |                 | 11.640 | 115/8   |        | 19/16                                 |  | 23/8  | 13/  |
| 187                 | 55.0      | 34.06 | 34       | 0.750 | 3/4    | 3/8             | 11.580 |   | 1.460  | 17/16                                 | 293/4  | 21/4  |      |
| 169                 | 49.5      | 33.82 | 337/8    | 0.730 | 11/16  |                 | 11.500 | 11 <sup>5</sup> / <sub>8</sub> 11 <sup>1</sup> / <sub>2</sub> | 1.340  | 15/ <sub>16</sub><br>11/ <sub>4</sub> | 29 <sup>3</sup> / <sub>4</sub><br>29 <sup>3</sup> / <sub>4</sub> | 2 <sup>1</sup> / <sub>8</sub><br>2 <sup>1</sup> / <sub>16</sub> | 11/  |
| TM 32X 12 X511      | 150.0     | 35.98 | 36       | 1.970 | 2      | 1               | 12.990 | 13  | 3.540  | 39/16                                 | 261/4  | 47/8  | 21/  |
| 462                 | 135.0     | 35.35 | 353/8    | 1.790 | 113/16 |                 | 12.815 | 127/8   | 3.230  | 31/4                                  | 261/4  | 49/16   | 21/  |
| 418                 | 122.0     | 34.80 | 343/4    | 1.630 | 15/8   | 13/16           | 12.655 | 125/8   | 2.950  | 3                                     | 261/4  | 41/4  | 2    |
| 380                 | 111.0     | 34.25 | 341/4    | 1.500 | 11/2   | 3/4             | 12.520 | 121/2   | 2.680  | 211/16                                |  | 4   | 2    |
| 343                 | 100.0     | 33.78 | 333/4    | 1.360 | 13/8   | 11/16           | 12.380 | 123/8   | 2.440  | 27/16                                 | 261/4  | 33/4  | 115  |
| 313                 | 92.0      | 33.39 | 333/8    | 1.240 | 11/4   | 5/8             | 12.260 | 121/4   | 2.240  | 21/4                                  | 261/4  | 39/16   | 17/  |
| 286                 | 84.0      | 32.99 | 33       | 1.140 | 11/8   | 9/16            | 12.165 | 121/8   | 2.050  | 21/16                                 | 261/4  | 33/8  | 113  |
| 256                 | 75.2      | 32.60 | 325/8    | 1.020 | 1      | 1/2             | 12.045 | 12  | 1.850  | 17/8                                  | 261/4  | 33/16   | 13/  |
| 234                 | 68.8      | 32.28 | 321/4    | 0.940 | 1      | 1/2             | 11.965 | 12  | 1.690  | 111/16                                |  | 3   | 11:  |
|                     |           |       |          |       |        |                 |        |   |        |                                       |  |   |      |
|                     |           |       |          |       |        |                 |        |   |        |                                       |  |   |      |

BEAMS

# TAILOR-MADE WIDE FLANGE BEAMS Properties



|        | -              | Distanc | 0      | om-<br>inal | Co                 |         | t Section       | on    | 889   |                 |       | Е       | astic-Pr | opertie | s        |      | Tor-<br>sional- |       | astic<br>dulus |
|--------|----------------|---------|--------|-------------|--------------------|---------|-----------------|-------|-------|-----------------|-------|---------|----------|---------|----------|------|-----------------|-------|----------------|
| ness   | T              |         | 1      | Wt.         | L                  | E'      | d               | F "   | $r_T$ | $\frac{d}{A_f}$ | А     | xis X-X | -24-3    |         | Axis Y-Y |      | con             | $Z_x$ | $Z_{\nu}$      |
|        | T              | k       | 4      | Ft.         | $\frac{b_f}{2t_f}$ | $F_{y}$ | $\frac{a}{t_w}$ | $F_y$ |       | Af              | I     | S       | r        | I       | S        | r    | J               | ZX    | - y            |
| In.    | ln.            | ln.     | 10     | Lb.         |                    | Ksi     |                 | Ksi   | ln.   | , al            | In.4  | In.3    | In.      | In.4    | In.3     | In.  | In.4            | In.3  | In.3           |
| 39/16  | 293/4          | A3/.    | 131,   | 619         | 2.4                | -       | 19.5            | -     | 4.51  | 0.64            | 41800 | 2170    | 15.2     | 2870    | 340      | 3.98 | 567             | 2560  | 537            |
|        | 293/4          |         | 121    | 567         | 2.6                | -       | 20.9            | -     | 4.46  | 0.69            | 37700 | 1990    | 15.1     | 2580    | 308      | 3.94 | 444             | 2330  | 485            |
|        |                | 313/16  | 42     | 515         | 2.8                | - 0     | 22.6            | -     | 4.42  | 0.75            | 33700 | 1810    | 14.9     | 2290    | 276      | 3.89 | 338             | 2110  | 433            |
|        | 293/4          |         | 19.    | 468         | 3.0                | - 0     | 24.2            | -     | 4.37  | 0.82            | 30100 | 1630    | 14.8     | 2030    | 247      | 3.85 | 256             | 1890  | 387            |
|        | 293/4          |         | 1710   | 424         | 3.3                | - 18    | 26.3            | -     | 4.33  | 0.90            | 26900 | 1480    | 14.7     | 1800    | 221      | 3.81 | 193             | 1700  | 345            |
|        | 293/4          |         | 134    | 387         | 3.6                | 1.0     | 28.5            | -     | 4.30  | 0.97            | 24300 | 1350    | 14.7     | 1620    | 200      | 3.79 | 149             | 1550  | 312            |
|        | 293/4          |         | 15,    | 354         | 3.9                | - 10    | 30.6            | -     | 4.27  | 1.06            | 21900 | 1230    | 14.5     | 1460    | 181      | 3.74 | 115             | 1420  | 282            |
|        |                | 211/16  |        | 318         | 4.2                | -       | 33.8            | 57.8  | 4.24  | 1.16            | 19500 | 1110    | 14.4     | 1290    | 161      | 3.71 | 84.4            | 1270  | 250            |
|        | 293/4          |         | 111    | 291         | 4.6                | -       | 36.3            | 50.1  | 4.21  | 1.27            | 17700 | 1010    | 14.4     | 1160    | 146      | 3.69 | 65.0            | 1150  | 226            |
|        | 293/4          |         | 13/5   | 263         | 5.0                | - 4     | 39.7            | 41.9  | 4.18  | 1.39            | 15800 | 917     | 14.3     | 1030    | 131      | 3.66 | 48.5            | 1040  | 202            |
| 39/16  | 293/4          | A3/a    | 135    | 520         | 1.8                | - 0     | 19.5            | -     | 3.34  | 0.85            | 32900 | 1710    | 14.7     | 1260    | 197      | 2.88 | 445             | 2060  | 321            |
|        | 293/4          |         | 111-   | 476         | 1.9                | -       | 21.0            | - 0   | 3.29  | 0.92            | 29700 | 1560    | 14.6     | 1120    | 177      | 2.84 | 348             | 1870  | 288            |
|        |                | 313/16  |        | 432         | 2.1                | -       | 22.6            | -     | 3.25  | 1.00            | 26500 | 1420    | 14.5     | 982     | 157      | 2.79 | 264             | 1680  | 255            |
|        | 293/4          | 39/16   | 150    | 398         | 2.2                | -       | 24.0            | - 1   | 3.21  | 1.08            | 24000 | 1300    | 14.3     | 881     | 142      | 2.74 | 209             | 1550  | 230            |
|        | 293/4          | 35/16   | 171    | 361         | 2.4                | -       | 26.0            | - 11  | 3.17  | 1.18            | 21400 | 1180    | 14.3     | 776     | 127      | 2.72 | 158             | 1380  | 204            |
|        | 293/4          |         | 17]    | 332         | 2.6                | -       | 27.7            | - 01  | 3.14  | 1.28            | 19500 | 1080    | 14.1     | 696     | 115      | 2.67 | 124             | 1280  | 184            |
|        | 293/4          | 3:      | 13/4   | 302         | 2.8                | -       | 30.2            | - 1   | 3.11  | 1.39            | 17500 | 983     | 14.1     | 620     | 103      | 2.65 | 95.0            | 1150  | 165            |
|        | 293/4          |         | 15%    | 271         | 3.1                |         | 33.2            | 59.8  | 3.07  | 1.54            | 15600 | 884     | 14.0     | 545     | 91.6     | 2.62 | 70.1            | 1030  | 146            |
| 10     | 293/4          | 29/16   | 11/    | 243         | 3.4                | -       | 36.3            | 50.1  | 3.04  | 1.71            | 13800 | 791     | 13.9     | 476     | 80.7     | 2.58 | 50.8            | 919   | 128            |
|        | 293/4          | 23/8    | 13/2   | 219         | 3.7                | - 26    | 39.7            | 41.9  | 3.01  | 1.88            | 12300 | 714     | 13.8     | 421     | 72.0     | 2.56 | 37.9            | 826   | 114            |
| 10     |                | 21/4    | 13.    | 204         | 4.0                | -       | 42.3            | 36.8  | 2.99  | 2.02            | 11400 | 662     | 13.8     | 385     | 66.2     | 2.54 | 30.5            | 764   | 104            |
|        | 293/4          | 21/8    | 11/2   | 187         | 4.3                | -       | 45.4            | 32.0  | 2.97  | 2.19            | 10300 | 607     | 13.7     | 348     | 60.1     | 2.52 | 23.8            | 699   | 94.            |
|        | 293/4<br>293/4 |         | 11/1   | 169         | 4.7                | - 1     | 50.5            | 25.9  | 2.95  | 2.41            | 9290  | 549     | 13.7     | 310     | 53.9     | 2.50 | 17.7            | 629   | 84.            |
|        | 261/4          | 47/8    | 21/4   | 511         | 1.8                | - 0     | 18.3            | -     | 3.41  | 0.78            | 28500 | 1580    | 13.8     | 1310    | 202      | 2.96 | 462             | 1920  | 328            |
| 0.10   | 261/4          | 49/16   | 21/8   | 462         | 2.0                | -       | 19.7            | - 11  | 3.35  | 0.85            | 25300 | 1430    | 13.7     | 1150    | 179      | 2.92 | 349             | 1710  | 290            |
| 0.14   | 261/4          | 41/4    | 2      | 418         | 2.1                | -       | 21.3            | -     | 3.31  | 0.93            | 22500 | 1290    | 13.6     | 1010    | 159      | 2.87 | 265             | 1530  | 257            |
|        | 261/4          | 4       | 2      | 380         | 2.3                | -       | 22.8            | - 01  | 3.26  | 1.02            | 20000 | 1170    | 13.4     | 886     | 142      | 2.83 | 200             | 1380  | 228            |
| - 110  | 261/4          | 33/4    | 115 16 | 343         | 2.5                | -       | 24.8            | - 0   | 3.22  | 1.12            | 17800 | 1060    | 13.4     | 779     | 126      | 2.79 | 151             | 1230  | 201            |
| 2 10   | 261/4          | 39/16   | 17/8   | 313         | 2.7                | -       | 26.9            | -     | 3.18  | 1.22            | 16100 | 963     | 13.2     | 694     | 113      | 2.75 | 116<br>89.5     | 1130  | 162            |
| 2 14   |                | 33/8    | 113/16 | 286         | 3.0                | -       | 28.9            | -     | 3.15  | 1.32            | 14500 | 878     | 13.1     | 620     | 102      | 2.72 |                 | 1030  | 143            |
| F . 10 | 261/4          | 33/16   | 13/4   | 256         | 3.3                | -       | 32.0            | 64.7  | 3.12  | 1.46            | 12800 | 788     | 13.1     | 542     | 90.0     | 2.68 | 65.6<br>50.5    | 832   | 128            |
| 17/8   | 261/4          |         | 111/16 | 234         | 3.5                | -       | 34.3            | 56.0  | 3.09  | 1.60            | 11600 | 719     | 13.0     | 485     | 81.1     | 2.66 | 50.5            | 832   | 120            |
|        | 261/4          | 0       |        |             |                    |         |                 |       |       |                 |       |         |          |         |          |      |                 |       |                |



### TAILOR-MADE WIDE FLANGE BEAMS **Dimensions**

Compac

Ksi Lb. 581 2.3 -526 2.5 -477 2.7 -433 2.9 -

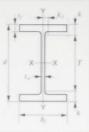
29

|              |      | Area  | De    | epth  |       | Web         |                 |        | Fla   | inge  | nonica |       | Distan   | се   | Nominal           |        | Com |
|--------------|------|-------|-------|-------|-------|-------------|-----------------|--------|-------|-------|--------|-------|--|------|-------------------|--------|-----|
| Designat     | ion  | A     |       | d     | 1     | kness<br>tw | $\frac{t_w}{2}$ | Wic    | dth   | Thick | ness   | T     | k  | k.   | Wt.<br>per<br>Ft. | bj 211 | 1   |
| Kat I i      |      | In.2  | In.   | In.   | In.   | ln.         | In.             | In.    | In.   | In.   | In.    | ln.   | In.  | In   | Lb.               | Ly     | K   |
| WTM 30X 15   | X581 | 170.0 | 35.39 | 353/8 | 1.970 | 2           | 1               | 16.200 | 161/4 | 3.540 | 39/16  | 2021  | 451  | 1    |                   |        |     |
|              | 526  | 154.0 | 34.76 | 343/4 | 1.790 |             |                 | 16.020 | 16    | 3.230 | 31/4   |       |  | 111  |                   |        | -   |
|              | 477  | 140.0 | 34.21 | 341/4 | 1.630 |             | 13/16           |        | 157/8 |       | 3 1/4  | 263/4 |  | 15/1 | 526               |        | -   |
|              | 433  | 127.0 | 33.66 | 335/8 | 1.500 |             | 3/4             | 15.725 | 153/4 | 2.680 |        | 263/4 |  | 19/  | 477               | 2.7    | -   |
|              | 391  | 114.0 | 33.19 | 331/4 | 1.360 |             | 11/16           |        | 155/8 | 2.440 |        | 263/4 | 10   | 11/: | 433               |        | -   |
|              | 357  | 104.0 | 32.80 | 323/4 | 1.240 |             | 5/8             | 15.470 | 151/2 |       | 27/16  | 263/4 |  | 17/  | 391               | 3.2    | -   |
|              | 326  | 95.7  | 32.40 | 323/8 | 1.140 |             | 9/16            | 15.370 | 153/8 | 2.240 | 21/4   | 263/4 |  | 13/  | 357               | 3.5    | -   |
|              | 292  | 85.7  | 32.01 | 32    | 1.020 | 1           | 1/2             | 15.255 |       | 2.050 | 21/16  | 263/4 |  |      | 326               | 3.7    | -   |
|              | 261  | 76.7  | 31.61 | 315/8 | 0.930 | 15/16       |                 |        | 151/4 | 1.850 | 17/8   | 263/4 |  | 11/  | 292               | 4.1    | -   |
|              | 235  | 69.0  | 31.30 | 311/4 | 0.830 | 13/16       |                 | 15.155 | 151/8 | 1.650 | 15/8   | 263/4 |  | 13/  | 261               | 4.6    | -   |
|              |      | 00.0  | 01.00 | 01-74 | 0.000 | 15/16       | 7/16            | 15.055 | 15    | 1.500 | 11/2   | 263/4 | 21/4   | 11/  | 235               | 5.0    | -   |
| WTM 30X 10.5 |      | 139.0 | 35.40 | 353/8 | 1.970 | 2           | 1               | 11.800 | 113/4 | 3.540 | 39/16  | 263/4 | 45/16  | 111  |                   |        |     |
|              | 435  | 127.0 | 34.85 | 347/8 | 1.810 | 113/16      | 1               | 11.640 | 115/8 | 3.270 | 31/4   | 263/4 | 41/16  | 15/  | 475               | 1.7    | -   |
|              | 394  | 115.0 | 34.30 | 341/4 | 1.650 | 15/8        | 13/16           | 11.485 | 111/2 | 2.990 | 3      | 263/4 | 33/4   | 19/  | 435               | 1.8    | -   |
|              | 358  | 105.0 | 33.74 | 333/4 | 1.520 | 11/2        | 3/4             | 11.345 | 113/8 | 2.720 | 23/4   | 263/4 | 31/2   | 11/  | 394               | 1.9    | -   |
|              | 323  | 95.0  | 33.27 | 331/4 | 1.380 | 13/8        | 11/16           | 11.205 | 111/4 | 2.480 | 21/2   | 263/4 | 31/4   | 13/  | 358               | 2.1    | -   |
|              | 295  | 86.6  | 32.88 | 327/8 | 1.260 | 11/4        | 5/8             | 11.090 | 111/8 | 2.280 | 21/4   | 263/4 | 31/16-   | 15/  |                   | 2.3    | -   |
|              | 269  | 79.1  | 32.48 | 321/2 | 1.160 | 13/16       | 5/8             | 10.990 | 11    | 2.090 | 21/16  | 263/4 | 27/8   | 15/  |                   | 2.4    | -   |
|              | 246  | 72.4  | 32.17 | 321/8 | 1.060 | 11/16       | 9/16            | 10.890 | 107/8 | 1.930 | 115/16 |       | 211/16   | 11/  | 269               |        | -   |
|              | 226  | 66.4  | 31.85 | 317/8 | 0.980 | 1           | 1/2             | 10.810 | 103/4 | 1.770 | 13/4   | 263/4 | 29/16  |      |                   | 2.8    | -   |
|              | 207  | 60.7  | 31.54 | 311/2 | 0.910 | 15/16       |                 | 10.735 | 103/4 | 1.610 | 15/8   | 263/4 |  | 13/  |                   | 3.1    | -   |
|              | 185  | 54.3  | 31.22 | 311/4 | 0.810 | 13/16       |                 | 10.635 | 105/8 | 1.460 | 17/16  | 263/4 | 23/8   | 13/  | 207               |        | -   |
|              | 165  | 48.5  | 30.91 | 307/8 | 0.730 | 3/4         | 3/8             | 10.555 | 101/2 | 1.300 | 15/16  | 263/4 | 21/4   | 11/  | 185               | 3.6    | -   |
|              | 148  | 43.5  | 30.67 | 305/8 | 0.650 | 5/8         | 5/16            | 10.480 | 101/2 | 1.180 | 13/16  | 263/4 | 21/16  | 11/  | 165               | 4.1    | -   |
| WTM 28X 12   | X485 | 142.0 | 32.13 | 321/8 | 1.970 | 2           | 1               | 13.010 | 13    | 3.540 | 39/16  | 223/4 | 411/16   | 21,  |                   |        |     |
|              | 438  | 128.0 | 31.50 | 311/2 | 1.790 | 113/16      | 1               | 12.835 | 127/8 | 3.230 | 31/4   | 223/4 | 43/8   | 2    | 485               | 1.8    | -   |
|              | 397  | 116.0 | 30.95 | 31    | 1.630 | 15/8        | 13/16           | 12.675 | 125/8 | 2.950 | 3      | 223/4 |  | 111  |                   | 2.0    |     |
|              | 360  | 105.0 | 30.39 | 303/8 | 1.500 | 11/2        | 3/4             | 12.540 | 121/2 | 2.680 | 211/16 |       | 4 <sup>1</sup> / <sub>8</sub><br>3 <sup>13</sup> / <sub>16</sub> |      |                   | 2.1    |     |
|              | 325  | 95.5  | 29.92 | 297/8 | 1.360 | 13/8        | 11/16           | 12.400 | 123/8 | 2.440 |        | 223/4 | 39/16  | 17,  |                   | 23     |     |
|              | 296  | 87.0  | 29.53 | 291/2 | 1.240 | 11/4        | 5/8             | 12.280 | 121/4 | 2.240 |        | 223/4 | 33/8   | 13   |                   | 25     |     |
|              | 270  | 79.5  | 29.13 | 291/8 | 1.140 | 11/8        | 9/16            | 12.185 | 121/8 | 2.050 |        | 223/4 | 33/16  | _    |                   | 27     |     |
|              | 247  | 72.7  | 28.82 | 287/8 | 1.040 | 11/16       | 9/16            | 12.085 | 121/8 | 1.890 |        |       |  | 11 3 | 270 3             | 3.0    |     |
|              | 226  | 66.5  | 28.50 | 281/2 | 0.960 | 1           | 1/2             | 12.005 | 12    | 1.730 |        |       | 31/16  | 15 . | 247 3             | 32 .   |     |
|              |      |       |       |       | 0.000 |             | 12              | 12.005 | 12    | 1.730 | 13/4   | 223/4 | 27/8   | 15   |                   | 15 .   |     |
|              |      |       |       |       |       |             |                 |        |       |       |        |       |  |      |                   |        |     |
|              |      |       |       |       |       |             |                 |        |       |       |        |       |  |      |                   |        |     |

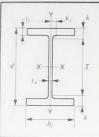


### BEAMS

# TAILOR-MADE WIDE FLANGE BEAMS Properties



|      |        | D     | stanci | 0      | lom-<br>inal | Co                 |        | t Sect<br>teria | ion  | 1000 |                 |       | E        | lastic-P | ropertie | is       |      | Tor-<br>sional- |                | astic<br>dulus |
|------|--------|-------|--------|--------|--------------|--------------------|--------|-----------------|------|------|-----------------|-------|----------|----------|----------|----------|------|-----------------|----------------|----------------|
| ess  | 7      | r     | k      | 1      | Wt.          | 6-                 | $F_y'$ | d               | F,"  | T    | $\frac{d}{A_f}$ |       | Axis X-X |          |          | Axis Y-Y |      | con             | Z <sub>x</sub> | 7              |
|      |        |       |        |        | Ft.          | $\frac{b_f}{2t_f}$ | 'y     | $\frac{a}{t_w}$ | 1 4  |      | Af              | I     | S        | r        | I        | S        | r    | I               | LX             | Zy             |
| In.  | In.    | 1.    | In.    | 1      | Lb.          |                    | Ksi    |                 | Ksi  | In.  |                 | In.4  | In.3     | In.      | In.4     | In.3     | In.  | In.4            | In.3           | In.3           |
| 39/  |        |       | 45/16  | 110,   | 581          | 2.3                |        | 18.0            | -    | 4.34 | 0.62            | 33000 | 1870     | 13.9     | 2530     | 312      | 3.86 | 537             | 2210           | 492            |
| 31/  |        | 3/4   |        | 15     | 526          | 2.5                |        | 19.4            | -    | 4.29 | 0.67            | 29300 | 1680     | 13.8     | 2230     | 278      | 3.80 | 405             | 1990           | 438            |
| 3    | 263    | 3/4   | 33/4   | 18.    | 477          | 2.7                | -      | 21.0            | -    | 4.24 | 0.73            | 26100 | 1530     | 13.7     | 1970     | 249      | 3.75 | 307             | 1790           | 390            |
| 211  | 16 263 | 3/4   | 37/16  | 19:    | 433          | 2.9                |        | 22.4            |      | 4.20 | 0.80            | 23200 | 1380     | 13.5     | 1750     | 222      | 3.71 | 231             | 1610           | 348            |
| 27/  | 6 263  | 3/4 : | 31/4   | 171-   | 391          | 3.2                |        | 24.4            |      | 4.16 | 0.87            | 20700 | 1250     | 13.5     | 1550     | 198      | 3.68 | 174             | 1430           | 310            |
| 21/  |        | 3/4   |        | 15,    | 357          | 3.5                |        | 26.5            |      | 4.12 | 0.95            | 18600 | 1140     | 13.4     | 1390     | 179      | 3.65 | 134             | 1300           | 279            |
| 21/  |        |       | 213/16 |        | 326          | 3.7                |        | 28.4            |      | 4.09 | 1.03            | 16800 | 1030     | 13.2     | 1240     | 162      | 3.61 | 103             | 1190           | 252            |
| 17/  |        | 3/4   |        | 11/4   | 292          | 4.1                |        | 31.4            |      | 4.06 | 1.13            | 14900 | 928      | 13.2     |          | 144      | 3.58 | 74.9            | 1060           |                |
| 15/  |        |       |        | 111.0  |              |                    | -      | 34.0            |      |      |                 |       |          |          | 1100     |          | 3.54 | 53.8            | 941            | 223            |
| 11/  |        | 3/4   |        | 16     | 261          | 4.6                | -      |                 | 57.2 | 4.02 | 1.26            | 13100 | 827      | 13.1     | 959      | 127      | 3.52 | 40.0            | 845            | 196            |
| 1.17 | 20"    | -/4   | 21/4   | 110    | 235          | 5.0                | -      | 37.7            | 46.4 | 4.00 | 1.39            | 11700 | 746      | 13.0     | 855      | 114      | 0.02 | 40.0            | 010            | 175            |
| 39/  | 6 263  | 3/4   | 45/16  | 100    | 475          | 1.7                | -      | 18.0            |      | 3.09 | 0.85            | 25100 | 1420     | 13.4     | 988      | 167      | 2.67 | 406             | 1720           | 274            |
| 31/  |        |       |        | 181    | 435          | 1.8                | -      | 19.3            |      | 3.04 | 0.92            | 22500 | 1290     | 13.3     | 874      | 150      | 2.62 | 317             | 1560           | 245            |
| 3    |        | 3/4   |        | 18.    | 394          | 1.9                |        | 20.8            |      | 2.99 | 1.00            | 20100 | 1170     | 13.2     | 766      | 133      | 2.58 | 241             | 1400           | 217            |
| 23/  |        | 3/4   |        |        | 358          | 2.1                |        | 22.2            | 1    | 2.95 | 1.09            | 17800 | 1060     | 13.0     | 671      | 118      | 2.53 | 182             | 1270           | 192            |
|      |        |       |        |        | 323          | 2.3                |        | 24.1            |      | 2.95 | 1.20            | 15900 | 955      | 12.9     | 588      | 105      | 2.49 | 137             | 1140           | 169            |
| 21/  |        |       | 31/16- | 184    | 295          |                    |        |                 |      |      |                 |       |          |          |          | 94.4     | 2.46 | 106             | 1030           | 152            |
| 21/  |        |       |        | 15.    |              | 2.4                | -      | 26.1            | -    | 2.88 | 1.30            | 14300 | 871      | 12.9     | 523      |          | 2.43 | 81.7            | 935            |                |
| 21/  |        |       | 27/8   |        | 269          | 2.6                | -      | 28.0            | -    | 2.85 | 1.41            | 12900 | 793      | 12.8     | 466      | 84.8     | 2.40 | 63.7            | 853            | 136            |
| 115  |        |       | 211/16 |        | 246          | 2.8                | -      | 30.3            | -    | 2.82 | 1.53            | 11700 | 727      | 12.7     | 418      | 76.8     | 2.38 | 49.4            | 777            | 123            |
| 13/  |        |       | 29/16  | 12.4   | 226          | 3.1                | - 1    | 32.5            | 62.5 | 2.79 | 1.66            | 10600 | 665      | 12.6     | 375      | 69.4     | 2.35 | 37.7            | 705            | 110            |
| 15/8 | 263    |       | 23/8   | 17/10  | 207          | 3.3                | -      | 34.7            | 55.0 | 2.76 | 1.82            | 9540  | 605      | 12.5     | 334      | 62.2     | 2.33 | 27.7            | 629            | 98.            |
| 17/  | 6 263  | 3/4   |        |        | 185          | 3.6                | -      | 38.5            | 44.5 | 2.74 | 2.01            | 8480  | 543      | 12.5     | 294      | 55.3     | 2.30 | 19.7            | 558            | 87.            |
| 15/  | 6 263  |       | 21/16  | 11/16  | 165          | 4.1                | -      | 42.3            | 36.8 | 2.71 | 2.25            | 7470  | 483      | 12.4     | 256      | 48.5     | 2.28 | 14.6            | 500            | 76.            |
| 13/  | 6 263  | 3/4   | 2      | 1 ,    | 148          | 4.4                | -      | 47.2            | 29.7 | 2.69 | 2.48            | 6680  | 436      | 12.4     | 227      | 43.3     | 2.20 | 14.0            | 500            | 68.            |
| 39/  | 223    | 3/4   | 411/16 | 21/8   | 485          | 1.8                | -      | 16.3            | -    | 3.45 | 0.70            | 21600 | 1350     | 12.3     | 1320     | 202      | 3.05 | 448             | 1630           | 325            |
| 31/  |        |       | 43/8   | 2 -    | 438          | 2.0                | -      | 17.6            | -    | 3.40 | 0.76            | 19100 | 1210     | 12.2     | 1150     | 179      | 3.00 | 338             | 1450           | 287            |
| 3    | 223    |       | 41/8   | 115/16 | 397          | 2.1                | -      | 19.0            | -    | 3.35 | 0.83            | 17000 | 1100     | 12.1     | 1010     | 160      | 2.95 | 257             | 1310           | 255            |
| 3    | 16 223 |       | 313/16 | 17/6   | 360          | 2.3                | -      | 20.3            | -    | 3.31 | 0.90            | 15000 | 990      | 12.0     | 889      | 142      | 2.91 | 194             | 1170           | 226            |
|      |        |       | 39/16  | 112/10 | 325          | 2.5                |        | 22.0            | -    | 3.27 | 0.99            | 13400 | 894      | 11.8     | 781      | 126      | 2.86 | 146             | 1060           | 200            |
| 27/  |        |       | 33/8   | 13/4   | 296          | 2.7                | -      | 23.8            | -    | 3.23 | 1.07            | 12000 | 815      | 11.8     | 696      | 113      | 2.83 | 112             | 957            | 179            |
| 21/1 |        |       | 33/16  | 117/4  | 270          | 3.0                | -      | 25.6            | -    | 3.20 | 1.17            | 10800 | 742      | 11.7     | 622      | 102      | 2.80 | 86.4            | 867            | 161            |
| 21/  |        | 1.4   | 31/16  | 15/4   | 247          | 3.2                | -      | 27.7            |      | 3.17 | 1.26            | 9800  | 680      | 11.6     | 559      | 92.5     | 2.77 | 67.3            | 790            | 146            |
| 17/8 |        | 1.9   | 27/8   | 15/4   | 226          | 3.5                | -      | 29.7            |      | 3.15 | 1.37            | 8850  | 621      | 11.5     | 501      | 83.5     | 2.74 | 52.0            | 718            | 131            |
| 3/   | 223    | 3/4 4 | 2.18   |        |              | 0.0                |        | 20.7            |      | 0.10 | 1.01            | 0000  | 021      | 11.0     |          |          |      |                 |                |                |
|      |        |       |        |        |              | 1                  |        | 1               |      |      |                 |       |          |          |          |          |      |                 |                |                |
|      |        |       |        |        |              |                    |        |                 |      |      |                 |       |          |          |          |          |      |                 |                |                |



## TAILOR-MADE WIDE FLANGE BEAMS Dimensions

Compact

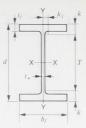
Ksi

15. 16. 17. 19. 20. 22. 23. 25. 27.

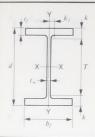
|             |   | Area   | De  | epth  |   | Web  |   |  | Fla  | nge   |   |   | Distan  | се             | Nom-<br>inal   |
|-------------|---|--|---|---|---|--|---|--|--|---|---|---|---|----------------|--|
| Designa     | ation   | A  |   | d   |   | ness<br>w  | $\frac{t_w}{2}$   | Wid<br>b   |  | Thick   |   | T   | k   | k <sub>1</sub> | Wt. per Ft.  |
| Est 1       |   | In.2   | In.   | In.   | In.   | In.  | In.   | In.  | In.  | ln.   | ln.   | In.   | In.   | In             | Lb   |
| WTM 27X 14  | X539<br>494   | 158.0<br>145.0   | 32.52<br>31.97  | 32 <sup>1</sup> / <sub>2</sub><br>32  | 1.970<br>1.810  | 2 113/11   |   | 15.255<br>15.095   | 15 <sup>1</sup> / <sub>4</sub> 15 <sup>1</sup> / <sub>8</sub>  | 3.540<br>3.270  | 39/16<br>31/4   | 24 24   | 41/4  | 15/1           | 539  |
|             | 448<br>407<br>368   | 131.0<br>119.0<br>108.0  | 31.42<br>30.87<br>30.39   | 31 <sup>3</sup> / <sub>8</sub><br>30 <sup>7</sup> / <sub>8</sub>  | 1.650   | 15/8   | 13/ <sub>16</sub><br>3/ <sub>4</sub>                          | 14.800   | 15<br>14 <sup>3</sup> / <sub>4</sub>   | 2.990<br>2.720  | 3 23/4  | 24<br>24  | 311/16  | 17/            | 448<br>407   |
|             | 336<br>307  | 98.7   | 30.39   | 30 <sup>3</sup> / <sub>8</sub><br>30<br>29 <sup>5</sup> / <sub>8</sub>  | 1.380<br>1.260<br>1.160   | 13/ <sub>8</sub><br>11/ <sub>4</sub><br>13/ <sub>16</sub>    | 11/16<br>5/8<br>5/8   | 14.665<br>14.545<br>14.445   | 14 <sup>5</sup> / <sub>8</sub><br>14 <sup>1</sup> / <sub>2</sub>   | 2.480   | 21/2 21/4   | 24  | 33/16   | 15/            | 368<br>336   |
|             | 281<br>258  | 82.6<br>75.7   | 29.29   | 291/4   | 1.060   | 11/16  | 9/ <sub>16</sub><br>1/ <sub>2</sub>                           | 14.350   | 14 <sup>1</sup> / <sub>2</sub><br>14 <sup>3</sup> / <sub>8</sub><br>14 <sup>1</sup> / <sub>4</sub>   | 2.090<br>1.930<br>1.770   | 2 <sup>1</sup> / <sub>16</sub><br>1 <sup>15</sup> / <sub>1</sub><br>1 <sup>3</sup> / <sub>4</sub> |   | 2 <sup>13</sup> / <sub>16</sub><br>2 <sup>5</sup> / <sub>8</sub><br>2 <sup>1</sup> / <sub>2</sub> | 11/            | 307<br>281   |
|             | 235<br>217  | 69.1<br>63.8   | 28.66<br>28.43  | 28 <sup>5</sup> / <sub>8</sub><br>28 <sup>3</sup> / <sub>8</sub>  | 0.910<br>0.830  | 15/16<br>13/16   | 1/2   | 14.190<br>14.115   | 14 <sup>1</sup> / <sub>4</sub><br>14 <sup>1</sup> / <sub>8</sub>   | 1.610   | 15/8  | 24 24   | 2 <sup>5</sup> / <sub>16</sub><br>2 <sup>3</sup> / <sub>16</sub>                                  | 11/            | 258<br>235<br>217  |
| W/TM 07V 10 | 194   | 57.0   | 28.11   | 281/8   | 0.750   | 3/4  | 3/8   | 14.035   | 14   | 1.340   | 15/16   | 199/4   | 21/16   | 1              | 194  |
| WTM 27X 10  | X446<br>407<br>369  | 130.0<br>119.0<br>108.0  | 32.52<br>31.97<br>31.41   | 321/2   | 1.970   | 113/16   |   | 11.370<br>11.210   | 11 <sup>3</sup> / <sub>8</sub><br>11 <sup>1</sup> / <sub>4</sub>   | 3.540<br>3.270  | 3 <sup>9</sup> / <sub>16</sub><br>3 <sup>1</sup> / <sub>4</sub>                                   | 24  | 41/4  | 15/<br>19/     | 446 .  |
|             | 335   | 98.3   | 30.86   | 31 <sup>3</sup> / <sub>8</sub><br>30 <sup>7</sup> / <sub>8</sub><br>30 <sup>3</sup> / <sub>8</sub>  | 1.650<br>1.520<br>1.380   | 15/ <sub>8</sub><br>11/ <sub>2</sub><br>13/ <sub>8</sub>     | 13/16<br>3/4<br>11/16   | 11.055<br>10.915<br>10.780   | 107/8  | 2.990   | 3 23/4  | 24  | 3/11/16   | 17/            | 369<br>335   |
|             | 271<br>247  | 79.5<br>72.5   | 29.92   | 29 <sup>7</sup> / <sub>8</sub><br>29 <sup>1</sup> / <sub>2</sub>  | 1.240   | 11/4   | 5/8<br>9/16   | 10.640   | 10 <sup>3</sup> / <sub>4</sub><br>10 <sup>5</sup> / <sub>8</sub><br>10 <sup>1</sup> / <sub>2</sub>   | 2.480<br>2.240<br>2.050   | 2 <sup>1</sup> / <sub>2</sub><br>2 <sup>1</sup> / <sub>4</sub><br>2 <sup>1</sup> / <sub>16</sub>  | 24<br>24<br>24  | 3 <sup>3</sup> / <sub>16</sub><br>3<br>2 <sup>3</sup> / <sub>4</sub>                              | 13/            | 302<br>271   |
|             | 221<br>201  | 64.8<br>59.2   | 29.13<br>28.82  | 29 <sup>1</sup> / <sub>8</sub><br>28 <sup>7</sup> / <sub>8</sub>  | 1.020<br>0.940  | 1  | 1/2   | 10.425   | 10 <sup>3</sup> / <sub>8</sub> 10 <sup>3</sup> / <sub>8</sub>  | 1.850   | 17/8  | 24  | 29/ <sub>16</sub><br>27/ <sub>16</sub>  | 11/            | 247<br>221<br>201  |
|             | 182<br>159  | 53.5<br>46.6   | 28.50   | 281/ <sub>2</sub><br>281/ <sub>8</sub>  | 0.850<br>0.750  | 7/8<br>3/4   | 7/ <sub>16</sub><br>3/ <sub>8</sub>                           | 10.245<br>10.150   | 101/ <sub>4</sub><br>101/ <sub>8</sub>   | 1.540<br>1.340  | 19/ <sub>16</sub><br>15/ <sub>16</sub>  | 24 24   | 21/4 21/16  | 11/            | 182<br>159   |
|             | 143<br>129  | 41.9<br>37.8   | 27.87<br>27.63  | 27 <sup>7</sup> / <sub>8</sub><br>27 <sup>5</sup> / <sub>8</sub>  | 0.670   | 11/16<br>5/8   | 3/ <sub>8</sub><br>5/ <sub>16</sub>                           | 10.070   | 10 <sup>1</sup> / <sub>8</sub>   | 1.220   | 11/ <sub>4</sub><br>11/ <sub>8</sub>  | 24<br>24  | 1 <sup>15</sup> / <sub>16</sub><br>1 <sup>13</sup> / <sub>16</sub>                                | 111            | 143<br>129   |
| WTM 26X12   | X 473<br>427<br>387<br>351<br>317<br>289<br>264<br>241<br>221 | 138.0<br>125.0<br>113.0<br>103.0<br>93.2<br>84.9<br>77.5<br>70.9<br>64.9 | 30.24<br>29.61<br>29.06<br>28.50<br>28.03<br>27.64<br>27.24<br>26.93<br>26.61 | 301/ <sub>4</sub><br>295/ <sub>8</sub><br>29<br>281/ <sub>2</sub><br>28<br>275/ <sub>8</sub><br>271/ <sub>4</sub><br>267/ <sub>8</sub><br>265/ <sub>8</sub> | 1.970<br>1.790<br>1.630<br>1.500<br>1.360<br>1.240<br>1.140<br>1.040<br>0.960 | 2<br>113/16<br>15/8<br>11/2<br>13/8<br>11/4<br>11/8<br>11/16 | 1<br>1<br>13/16<br>3/4<br>11/16<br>5/8<br>9/16<br>9/16<br>1/2 | 13.050<br>12.870<br>12.715<br>12.575<br>12.440<br>12.320<br>12.220<br>12.125<br>12.045 | 13<br>12 <sup>7</sup> / <sub>8</sub><br>12 <sup>3</sup> / <sub>4</sub><br>12 <sup>5</sup> / <sub>8</sub><br>12 <sup>1</sup> / <sub>2</sub><br>12 <sup>3</sup> / <sub>8</sub><br>12 <sup>1</sup> / <sub>4</sub><br>12 <sup>1</sup> / <sub>8</sub><br>12 | 3.540<br>3.230<br>2.950<br>2.680<br>2.440<br>2.240<br>2.050<br>1.890<br>1.730 | 39/16<br>31/4<br>3<br>211/16<br>27/16<br>21/4<br>21/16<br>17/8<br>13/4                            | 207/8<br>207/8<br>207/8<br>207/8<br>207/8<br>207/8<br>207/8<br>207/8<br>207/8 |   | 2              | 473 427 4<br>427 4<br>387 4<br>351 4<br>369 4<br>264 3<br>264 3<br>261 3 |

BEAMS

# TAILOR-MADE WIDE FLANGE BEAMS Properties



|        | [     | Distance |       | Iom-<br>inal | Co                 |         | t Secti<br>teria | on   |       |                 |       | Е        | lastic-P | ropertie | s        |      | Tor-<br>sional- |                | astic<br>dulus |
|--------|-------|----------|-------|--------------|--------------------|---------|------------------|------|-------|-----------------|-------|----------|----------|----------|----------|------|-----------------|----------------|----------------|
| ness   | T     | 6        |       | Wt.          | ,                  | E'      | ,                | E "" | $r_T$ | $\frac{d}{A_f}$ | A     | Axis X-X |          | Harris . | Axis Y-Y |      | con             | $Z_{x}$        | $Z_{\nu}$      |
|        | 1     | K        | 4     | Ft.          | $\frac{b_f}{2t_f}$ | $F_{y}$ | $\frac{d}{t_w}$  | F,"  |       | Af              | I     | S        | r        | I        | S        | r    | J               | Z <sub>X</sub> | 24             |
| ln.    | ln.   | ln.      | h     | Lb.          |                    | Ksi     |                  | Ksi  | ln.   |                 | In.4  | In.3     | In.      | In.4     | In.3     | In.  | In.4            | In.3           | In.3           |
| 39/16  | 24    | 41/4     | 15),  | 539          | 2.2                |         | 16.5             |      | 4.10  | 0.60            | 25500 | 1570     | 12.7     | 2110     | 277      | 3.66 | 499             | 1880           | 437            |
| 31/4   | 24    | 4        | 19/4  |              |                    |         |                  |      |       |                 |       | 1440     |          | 1890     | 250      | 3.61 | 391             | 1710           | 394            |
| 3      | 24    |          | 11/2  | 494          | 2.3                |         | 17.7             |      | 4.05  | 0.65            | 22900 |          | 12.6     |          |          |      | 297             | 1530           | 351            |
| 23/4   | 24    | 311/16   |       | 448          | 2.5                | -       | 19.0             | -    | 4.01  | 0.70            | 20400 | 1300     | 12.5     | 1670     | 224      | 3.57 |                 |                |                |
|        |       | 37/16    |       | 407          | 2.7                | -       | 20.3             | -    | 3.96  | 0.77            | 18100 | 1170     | 12.3     | 1480     | 200      | 3.52 | 225             | 1380           | 313            |
| 21/2   | 24    | 33/16    |       | 368          | 3.0                | -       | 22.0             | -    | 3.93  | 0.84            | 16100 | 1060     | 12.2     | 1310     | 179      | 3.48 | 169             | 1240           | 279            |
| 21/4   | 24    | 3        | 15/8  | 336          | 3.2                | -       | 23.8             | -    | 3.89  | 0.90            | 14500 | 970      | 12.1     | 1170     | 161      | 3.45 | 131             | 1130           | 252            |
| 21/16  | 24    | 213/16   | 11/4  | 307          | 3.5                | -       | 25.5             | -    | 3.86  | 0.98            | 13100 | 884      | 12.0     | 1050     | 146      | 3.42 | 101             | 1020           | 227            |
| 115/16 | 24    | 25/8     | 13/18 | 281          | 3.7                | -       | 27.6             | -    | 3.84  | 1.06            | 11900 | 811      | 12.0     | 953      | 133      | 3.40 | 78.8            | 933            | 206            |
| 13/4   | 24    | 21/2     | 11/2  | 258          | 4.0                | - 1     | 29.6             | -    | 3.81  | 1.15            | 10800 | 742      | 11.9     | 859      | 120      | 3.37 | 61.0            | 850            | 187            |
| 15/8   | 24    | 25/16    | 11/2  | 235          | 4.4                | -       | 31.5             | -    | 3.78  | 1.25            | 9660  | 674      | 11.8     | 768      | 108      | 3.33 | 46.3            | 769            | 168            |
| 11/2   | 24    | 23/16    |       | 217          | 4.7                | -       | 34.3             | 56.3 | 3.76  | 1.34            | 8870  | 624      | 11.8     | 704      | 99.8     | 3.32 | 37.0            | 708            | 154            |
| 15/16  |       | 21/16    | 1     | 194          | 5.2                | -       | 37.5             | 47.0 | 3.74  | 1.49            | 7820  | 556      | 11.7     | 618      | 88.1     | 3.29 | 26.5            | 628            | 136            |
| 39/16  | 24    | 41/4     | 15),  | 446          | 1.6                | -       | 16.5             |      | 2.99  | 0.81            | 19700 | 1210     | 12.3     | 884      | 155      | 2.61 | 385             | 1470           | 254            |
| 31/4   | 24    | 4        | 19/4  | 407          | 1.7                | _       | 17.7             | A    | 2.95  | 0.87            | 17700 | 1110     | 12.2     | 781      | 139      | 2.56 | 300             | 1340           | 227            |
|        |       | 311/16   |       | 369          | 1.8                | -       | 19.0             | _    | 2.90  | 0.95            | 15700 | 1000     | 12.1     | 683      | 124      | 2.51 | 228             | 1200           | 200            |
| 3      | 24    |          | 17/13 |              |                    |         | 20.3             |      | 2.86  | 1.04            | 13900 | 902      | 11.9     | 597      | 109      | 2.46 | 173             | 1080           | 177            |
| 23/4   | 24    | 37/16    |       | 335          | 2.0                | -       |                  | -    |       |                 |       |          |          | 524      | 97.1     | 2.43 | 130             | 973            | 156            |
| 21/2   | 24    | 33/16    | 13/8  | 302          | 2.2                | -       | 22.0             | -    | 2.82  | 1.14            | 12400 | 815      | 11.8     |          |          |      |                 | 864            | 137            |
| 21/4   | 24    | 3        | 11/4  | 271          | 2.4                | -       | 24.1             | -    | 2.78  | 1.26            | 10900 | 729      | 11.7     | 454      | 85.3     | 2.39 | 95.0            |                |                |
| 21/16  | 24    | 23/4     | 11/4  |              | 2.6                | -       | 25.9             | -    | 2.75  | 1.37            | 9780  | 662      | 11.6     | 403      | 76.5     | 2.36 | 72.9            | 782            | 122            |
| 17/8   | 24    | 29/16    | 13/16 | 221          | 2.8                | -       | 28.6             | -    | 2.71  | 1.51            | 8630  | 593      | 11.5     | 352      | 67.5     | 2.33 | 53.1            | 695            | 107            |
| 111/1  | 24    | 27/16    | 11/8  | 201          | 3.1                | -       | 30.7             | -    | 2.69  | 1.65            | 7780  | 540      | 11.5     | 314      | 60.7     | 2.30 | 40.7            | 630            | 96             |
| 19/16  |       | 21/4     | 11/16 | 182          | 3.3                | -       | 33.5             | 58.8 | 2.66  | 1.81            | 6950  | 488      | 11.4     | 277      | 54.2     | 2.28 | 30.6            | 567            | 85.            |
| 15/16  |       | 21/16    | 1     | 159          | 3.8                | -       | 37.5             | 47.0 | 2.63  | 2.07            | 5950  | 424      | 11.3     | 235      | 46.2     | 2.24 | 20.3            | 489            | 72.            |
|        | 24    | 115/18   | 1     | 143          | 4.1                | -       | 41.6             | 38.2 | 2.61  | 2.27            | 5330  | 383      | 11.3     | 208      | 41.4     | 2.23 | 15.1            | 440            | 64.            |
| 11/4   | 24    | 113/16   |       | 129          | 4.5                | -       | 45.3             | 32.2 | 2.59  | 2.51            | 4760  | 345      | 11.2     | 184      | 36.8     | 2.21 | 11.2            | 395            | 57.            |
| 201    | 207/8 | 411/16   | 21/8  | 473          | 1.8                | -       | 15.4             | -    | 3.48  | 0.65            | 18700 | 1240     | 11.6     | 1330     | 203      | 3.10 | 444             | 1490           | 325            |
| 39/16  |       | 101      | 2     | 427          | 2.0                | -       | 16.5             | -    | 3.43  | 0.71            | 16500 | 1120     | 11.5     | 1160     | 180      | 3.05 | 335             | 1340           | 287            |
| 31/4   | 207/8 |          | 115/4 | 387          | 2.2                | -       | 17.8             | -    | 3.38  | 0.77            | 14700 | 1010     | 11.4     | 1020     | 160      | 3.00 | 255             | 1200           | 255            |
| 3      | 207/8 |          | (2)   | 351          | 2.3                | -       | 19.0             | -    | 3.34  | 0.85            | 12900 | 909      | 11.2     | 896      | 142      | 2.95 | 192             | 1080           | 226            |
| 211/1  |       | -01      | 113/1 | 317          | 2.5                | -       | 20.6             | -    | 3.30  | 0.92            | 11500 | 821      | 11.1     | 789      | 127      | 2.91 | 145             | 970            | 200            |
| 27/16  |       |          | 13/4  | 289          | 2.7                | -       | 22.3             | -    | 3.26  | 1.00            | 10300 | 748      | 11.0     | 703      | 114      | 2.88 | 111             | 878            | 180            |
| 21/4   | 207/8 |          | 111/4 |              | 3.0                |         | 23.9             |      | 3.23  | 1.00            | 9270  | 680      | 10.9     | 627      | 103      | 2.85 | 85.6            | 795            | 161            |
| 21/16  | 207/8 |          |       | 241          |                    | -       |                  |      |       | 1.18            | 8400  | 624      | 10.9     | 564      | 93.1     | 2.82 | 66.7            | 724            | 146            |
| 17/8   | 207/8 | 3        | 15/8  |              | 3.2                | -       | 25.9             | -    | 3.20  |                 |       |          | 10.9     | 506      | 84.0     | 2.79 | 51.6            | 658            | 132            |
| 13/4   | 207/8 |          | 15/8  | 221          | 3.5                | -       | 27.7             |      | 3.18  | 1.28            | 7580  | 569      | 10.8     | 506      | 84.0     | 2.79 | 51.6            | 000            | 152            |

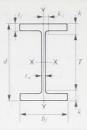


## TAILOR-MADE WIDE FLANGE BEAMS Dimensions

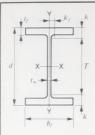
| In.2  144.0 132.0 119.0 108.0 98.4 89.8 82.0 73.5 67.2 56.3 51.7  134.0 121.0 110.0 100.0 91.2 82.1 74.4 67.0  |  | 295/8<br>291/8<br>291/8<br>281/2<br>28<br>271/2<br>271/2<br>271/2<br>251/4<br>263/8<br>263/4<br>251/2<br>251/4<br>281/4<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275/8<br>275 |   | 113/ <sub>11</sub><br>15/ <sub>8</sub><br>11/ <sub>2</sub><br>13/ <sub>8</sub><br>11/ <sub>4</sub><br>13/ <sub>16</sub><br>11/ <sub>16</sub>   | 13/16<br>3/4<br>11/16<br>5/8<br>5/8<br>9/16<br>1/2<br>7/16<br>3/8<br>1<br>1<br>13/16<br>3/4<br>11/16  | 13.660<br>13.520<br>13.405<br>13.305<br>13.185<br>13.110<br>13.010<br>12.950<br>12.890<br>13.050<br>12.890<br>12.735<br>12.595           |  | Thick 1/2 In. 3.540 3.270 2.990 2.720 2.480 2.280 2.090 1.8730 1.570 1.460 1.340 3.520 3.210 2.930 2.700   | 39/16<br>31/4<br>3<br>23/4<br>21/2<br>21/4<br>21/16<br>17/16<br>15/16<br>31/2<br>33/16<br>211/16   | 21<br>21<br>21<br>21<br>21<br>21<br>21<br>21<br>21<br>21<br>21<br>21<br>21<br>2  | k In. 45/16 41/16 33/4 31/2 31/4 31/16 27/8 211/16 21/2 23/8 21/4 43/16 43/16 4  | k <sub>1</sub>   In.   19/ <sub>11</sub>   11/ <sub>2</sub>   13/ <sub>6</sub>   15/ <sub>1</sub>   11/ <sub>4</sub>   13/ <sub>1</sub>   11/ <sub>8</sub>   1   1   1   15/ <sub>2</sub>   21/ <sub>5</sub>   21/ <sub>5</sub>   17/ <sub>6</sub>   17 | 450<br>408<br>370<br>335<br>306<br>279<br>250<br>229<br>207<br>192<br>176<br>414<br>375<br>343   | 2.0<br>2.1<br>2.3<br>2.5<br>2.7<br>2.9<br>3.2<br>3.5<br>3.8<br>4.1<br>4.4<br>4.8<br>1.9<br>2.0<br>2.2<br>2.3  | Ksi   |
|--|--|---|---|--|---|--|--|--|--|--|--|--|--|---|---|
| 144.0<br>132.0<br>119.0<br>108.0<br>98.4<br>89.8<br>82.0<br>73.5<br>67.2<br>60.7<br>56.3<br>51.7<br>134.0<br>121.0<br>110.0<br>100.0<br>91.2<br>82.1<br>74.4 | 29.65<br>29.09<br>28.54<br>27.99<br>27.52<br>27.13<br>26.73<br>26.34<br>26.02<br>25.71<br>25.47<br>25.24<br>28.31<br>27.68<br>27.13<br>26.65<br>26.18<br>27.13 | 295/8<br>291/8<br>281/2<br>28<br>271/2<br>271/8<br>263/4<br>263/8<br>253/4<br>251/2<br>251/4<br>281/4<br>275/8<br>271/8<br>265/8<br>261/8<br>263/4  | 1.970<br>1.810<br>1.650<br>1.520<br>1.380<br>1.160<br>1.040<br>0.960<br>0.870<br>0.810<br>0.750<br>1.950<br>1.630<br>1.500<br>1.360   | 2<br>113/11<br>15/8<br>11/2<br>13/8<br>11/4<br>13/16<br>1<br>1/16<br>1<br>7/8<br>13/16<br>3/4<br>2<br>113/16<br>15/8<br>11/2<br>13/8   | 1 1 13/16 3/4 11/16 3/4 11/16 3/4 11/16   | 14.115<br>13.955<br>13.800<br>13.660<br>13.520<br>13.305<br>13.185<br>13.110<br>13.010<br>12.950<br>12.890<br>12.890<br>12.735<br>12.595 | 141/8<br>14<br>133/4<br>135/8<br>131/2<br>133/8<br>131/4<br>131/8<br>13<br>127/8<br>13<br>127/8<br>123/4<br>125/8  | 3.540<br>3.270<br>2.990<br>2.720<br>2.480<br>2.280<br>2.090<br>1.890<br>1.730<br>1.570<br>1.460<br>1.340<br>3.520<br>3.210<br>2.930<br>2.700   | 39/16<br>31/4<br>3<br>23/4<br>21/2<br>21/4<br>21/16<br>17/16<br>15/16<br>31/2<br>33/16<br>215/16<br>211/16   | 21<br>21<br>21<br>21<br>21<br>21<br>21<br>21<br>21<br>21<br>21<br>21<br>21<br>2  | 45/16<br>41/16<br>33/4<br>31/2<br>31/4<br>31/16<br>27/8<br>211/16<br>21/2<br>23/8<br>21/4<br>21/8<br>43/4<br>47/16<br>43/16<br>4   | 19/11<br>11/2<br>13/8<br>15/1<br>11/4<br>13/1<br>11/8<br>1<br>1<br>1<br>1<br>1<br>1<br>1<br>21/E<br>2<br>115/<br>17/E  | 492<br>450<br>408<br>370<br>335<br>306<br>279<br>250<br>229<br>207<br>192<br>176<br>457<br>414<br>375<br>343   | 2.0<br>2.1<br>2.3<br>2.5<br>2.7<br>2.9<br>3.2<br>3.5<br>3.8<br>4.1<br>4.4<br>4.8<br>1.9<br>2.0<br>2.2<br>2.3  |   |
| 132.0<br>119.0<br>108.0<br>98.4<br>89.8<br>82.0<br>73.5<br>67.2<br>60.7<br>56.3<br>51.7<br>134.0<br>110.0<br>100.0<br>91.2<br>82.1<br>74.4                   | 29.09<br>28.54<br>27.99<br>27.52<br>27.13<br>26.73<br>26.34<br>26.02<br>25.71<br>25.47<br>25.24<br>28.31<br>27.68<br>27.13<br>26.65<br>26.18<br>25.71          | 291/8<br>281/2<br>28<br>271/8<br>263/4<br>263/8<br>26<br>253/4<br>251/2<br>251/4<br>281/4<br>275/8<br>271/8<br>265/8<br>261/8<br>253/4  | 1.810<br>1.650<br>1.520<br>1.380<br>1.260<br>1.160<br>0.960<br>0.870<br>0.810<br>0.750<br>1.950<br>1.790<br>1.630<br>1.500<br>1.360   | 113/11<br>15/8<br>11/2<br>13/8<br>11/4<br>13/16<br>11/16<br>1<br>7/8<br>13/16<br>3/4<br>2<br>113/16<br>15/8<br>11/2<br>13/8  | 5 1<br>13/16<br>3/4<br>11/16<br>5/8<br>9/16<br>1/2<br>7/16<br>3/8<br>1<br>1<br>1<br>13/16<br>3/4<br>11/16   | 13.955<br>13.800<br>13.660<br>13.520<br>13.405<br>13.305<br>13.110<br>13.010<br>12.950<br>12.890<br>12.735<br>12.595                     | 14<br>133/4<br>135/8<br>131/2<br>133/8<br>131/4<br>131/8<br>13<br>127/8<br>13<br>127/8<br>13<br>127/8<br>123/4<br>125/8  | 3.270<br>2.990<br>2.720<br>2.480<br>2.280<br>2.090<br>1.890<br>1.730<br>1.570<br>1.460<br>1.340<br>3.520<br>3.210<br>2.930<br>2.700  | 31/4<br>3<br>23/4<br>21/2<br>21/4<br>21/16<br>17/8<br>13/4<br>19/16<br>15/16<br>31/2<br>33/16<br>215/16<br>211/16  | 21<br>21<br>21<br>21<br>21<br>21<br>21<br>21<br>21<br>21<br>21<br>21<br>21<br>2  | 41/16<br>33/4<br>31/2<br>31/4<br>31/16<br>27/8<br>211/16<br>21/2<br>23/8<br>21/4<br>21/8<br>43/4<br>47/16<br>43/16   | 11/2<br>13/8<br>15/1<br>11/4<br>13/1<br>11/8<br>1<br>1<br>1<br>1<br>15/<br>21/E<br>2<br>115,<br>17/E   | 450<br>408<br>370<br>335<br>306<br>279<br>250<br>229<br>207<br>192<br>176<br>414<br>375<br>343   | 2.1<br>2.3<br>2.5<br>2.7<br>2.9<br>3.2<br>3.5<br>3.8<br>4.1<br>4.4<br>4.8   |   |
| 119.0<br>108.0<br>98.4<br>89.8<br>82.0<br>73.5<br>67.2<br>60.7<br>56.3<br>51.7<br>134.0<br>121.0<br>110.0<br>100.0<br>91.2<br>82.1<br>74.4                   | 28.54<br>27.99<br>27.52<br>27.13<br>26.73<br>26.34<br>26.02<br>25.71<br>25.47<br>25.24<br>28.31<br>27.68<br>27.13<br>26.65<br>26.18<br>25.71                   | 281/ <sub>2</sub><br>28<br>271/ <sub>2</sub><br>271/ <sub>8</sub><br>263/ <sub>4</sub><br>263/ <sub>8</sub><br>26<br>253/ <sub>4</sub><br>251/ <sub>2</sub><br>251/ <sub>4</sub><br>281/ <sub>4</sub><br>275/ <sub>8</sub><br>271/ <sub>8</sub><br>265/ <sub>8</sub><br>261/ <sub>8</sub><br>253/ <sub>4</sub>  | 1,650<br>1,520<br>1,380<br>1,260<br>1,160<br>1,040<br>0,960<br>0,870<br>0,810<br>0,750<br>1,950<br>1,790<br>1,630<br>1,500<br>1,360   | 113/ <sub>11</sub><br>15/ <sub>8</sub><br>11/ <sub>2</sub><br>13/ <sub>8</sub><br>11/ <sub>4</sub><br>13/ <sub>16</sub><br>11/ <sub>16</sub><br>1<br>7/ <sub>8</sub><br>13/ <sub>16</sub><br>3/ <sub>4</sub><br>2<br>113/ <sub>16</sub><br>15/ <sub>8</sub><br>11/ <sub>2</sub><br>13/ <sub>8</sub>  | 13/16<br>3/4<br>11/16<br>5/8<br>5/8<br>9/16<br>1/2<br>7/16<br>3/8<br>1<br>1<br>13/16<br>3/4<br>11/16  | 13.955<br>13.800<br>13.660<br>13.520<br>13.405<br>13.305<br>13.110<br>13.010<br>12.950<br>12.890<br>12.735<br>12.595                     | 14<br>133/4<br>135/8<br>131/2<br>133/8<br>131/4<br>131/8<br>13<br>127/8<br>13<br>127/8<br>13<br>127/8<br>123/4<br>125/8  | 3.270<br>2.990<br>2.720<br>2.480<br>2.280<br>2.090<br>1.890<br>1.730<br>1.570<br>1.460<br>1.340<br>3.520<br>3.210<br>2.930<br>2.700  | 31/4<br>3<br>23/4<br>21/2<br>21/4<br>21/16<br>17/8<br>13/4<br>19/16<br>15/16<br>31/2<br>33/16<br>215/16<br>211/16  | 21<br>21<br>21<br>21<br>21<br>21<br>21<br>21<br>21<br>21<br>21<br>21<br>21<br>2  | 41/16<br>33/4<br>31/2<br>31/4<br>31/16<br>27/8<br>211/16<br>21/2<br>23/8<br>21/4<br>21/8<br>43/4<br>47/16<br>43/16   | 11/2<br>13/8<br>15/1<br>11/4<br>13/1<br>11/8<br>1<br>1<br>1<br>1<br>15/<br>21/E<br>2<br>115,<br>17/E   | 450<br>408<br>370<br>335<br>306<br>279<br>250<br>229<br>207<br>192<br>176<br>414<br>375<br>343   | 2.1<br>2.3<br>2.5<br>2.7<br>2.9<br>3.2<br>3.5<br>3.8<br>4.1<br>4.4<br>4.8   |   |
| 108.0<br>98.4<br>89.8<br>82.0<br>73.5<br>67.2<br>60.7<br>56.3<br>51.7<br>134.0<br>121.0<br>110.0<br>91.2<br>82.1<br>74.4                                     | 27.99<br>27.52<br>27.13<br>26.73<br>26.34<br>26.02<br>25.71<br>25.47<br>25.24<br>28.31<br>27.68<br>27.13<br>26.65<br>26.18<br>25.71                            | 28<br>271/2<br>271/8<br>263/4<br>263/8<br>26<br>253/4<br>251/2<br>251/4<br>281/4<br>275/8<br>271/8<br>265/8<br>261/8<br>253/4   | 1.520<br>1.380<br>1.260<br>1.160<br>1.040<br>0.960<br>0.870<br>0.810<br>0.750<br>1.950<br>1.790<br>1.630<br>1.500<br>1.360  | 15/8<br>11/2<br>13/8<br>11/4<br>13/16<br>11/16<br>1<br>7/8<br>13/16<br>3/4<br>2<br>113/16<br>15/8<br>11/2<br>13/8  | 13/16<br>3/4<br>11/16<br>5/8<br>5/8<br>9/16<br>1/2<br>7/16<br>3/8<br>1<br>1<br>13/16<br>3/4<br>11/16  | 13.800<br>13.660<br>13.520<br>13.405<br>13.305<br>13.185<br>13.110<br>12.950<br>12.890<br>13.050<br>12.890<br>12.735<br>12.595           | 133/ <sub>4</sub><br>135/ <sub>8</sub><br>131/ <sub>2</sub><br>133/ <sub>8</sub><br>131/ <sub>4</sub><br>131/ <sub>8</sub><br>13<br>127/ <sub>8</sub><br>13<br>127/ <sub>8</sub><br>123/ <sub>4</sub><br>125/ <sub>8</sub>   | 2.990<br>2.720<br>2.480<br>2.280<br>2.090<br>1.890<br>1.730<br>1.570<br>1.460<br>1.340<br>3.520<br>3.210<br>2.930<br>2.700   | 3<br>23/4<br>21/2<br>21/4<br>21/16<br>17/8<br>13/4<br>19/16<br>15/16<br>31/2<br>33/16<br>215/16<br>211/16  | 21<br>21<br>21<br>21<br>21<br>21<br>21<br>21<br>21<br>21<br>21<br>21<br>21<br>83/4<br>183/4<br>183/4   | 33/4<br>31/2<br>31/4<br>31/16<br>27/8<br>211/16<br>21/2<br>23/8<br>21/4<br>21/8<br>43/4<br>47/16<br>43/16  | 13/8<br>15/1<br>11/4<br>13/1<br>11/8<br>1<br>1<br>1<br>1<br>15/<br>21/E<br>2<br>115,<br>17/E   | 408<br>370<br>335<br>306<br>279<br>250<br>229<br>207<br>192<br>176<br>457<br>414<br>875<br>343   | 2.3<br>2.5<br>2.7<br>2.9<br>3.2<br>3.5<br>3.8<br>4.1<br>4.4<br>4.8  |   |
| 98.4<br>89.8<br>82.0<br>73.5<br>67.2<br>60.7<br>56.3<br>51.7<br>134.0<br>121.0<br>110.0<br>100.0<br>91.2<br>82.1<br>74.4                                     | 27.52<br>27.13<br>26.73<br>26.34<br>26.02<br>25.71<br>25.47<br>25.24<br>28.31<br>27.68<br>27.13<br>26.65<br>26.18<br>25.71                                     | 271/ <sub>2</sub><br>271/ <sub>8</sub><br>263/ <sub>4</sub><br>263/ <sub>8</sub><br>26<br>253/ <sub>4</sub><br>251/ <sub>2</sub><br>251/ <sub>4</sub><br>281/ <sub>4</sub><br>275/ <sub>8</sub><br>271/ <sub>8</sub><br>265/ <sub>8</sub><br>261/ <sub>8</sub><br>253/ <sub>4</sub>   | 1.380<br>1.260<br>1.160<br>1.040<br>0.960<br>0.870<br>0.810<br>0.750<br>1.950<br>1.790<br>1.630<br>1.500<br>1.360   | 13/8<br>11/4<br>13/16<br>11/16<br>1<br>7/8<br>13/16<br>3/4<br>2<br>113/16<br>15/8<br>11/2<br>13/8  | 11/16<br>5/8<br>5/8<br>9/16<br>1/2<br>7/16<br>7/16<br>3/8<br>1<br>1<br>13/16<br>3/4<br>11/16  | 13.520<br>13.405<br>13.305<br>13.185<br>13.110<br>13.010<br>12.950<br>12.890<br>13.050<br>12.890<br>12.735<br>12.595                     | 131/ <sub>2</sub><br>133/ <sub>8</sub><br>131/ <sub>4</sub><br>131/ <sub>8</sub><br>13 13<br>12 <sup>7</sup> / <sub>8</sub><br>13<br>12 <sup>7</sup> / <sub>8</sub><br>12 <sup>3</sup> / <sub>4</sub><br>12 <sup>5</sup> / <sub>8</sub>  | 2.720<br>2.480<br>2.280<br>2.090<br>1.890<br>1.730<br>1.570<br>1.460<br>1.340<br>3.520<br>3.210<br>2.930<br>2.700  | 23/4<br>21/2<br>21/4<br>21/16<br>17/8<br>13/4<br>19/16<br>15/16<br>31/2<br>33/16<br>215/16<br>211/16   | 21<br>21<br>21<br>21<br>21<br>21<br>21<br>21<br>21<br>18 <sup>3</sup> / <sub>4</sub><br>18 <sup>3</sup> / <sub>4</sub><br>18 <sup>3</sup> / <sub>4</sub> | 31/2<br>31/4<br>31/16<br>27/8<br>211/16<br>21/2<br>23/8<br>21/4<br>21/8<br>43/4<br>47/16<br>43/16  | 15/1<br>11/4<br>13/1<br>11/8<br>11/8<br>1<br>1<br>1<br>15/<br>21/E<br>2<br>115/<br>17/E  | 370<br>335<br>306<br>279<br>250<br>229<br>207<br>192<br>176<br>457<br>414<br>975<br>343  | 2.5<br>2.7<br>2.9<br>3.2<br>3.5<br>3.8<br>4.1<br>4.4<br>4.8<br>1.9<br>2.0<br>2.2<br>2.3   |   |
| 89.8<br>82.0<br>73.5<br>67.2<br>60.7<br>56.3<br>51.7<br>134.0<br>121.0<br>110.0<br>91.2<br>82.1<br>74.4  | 27.13<br>26.73<br>26.34<br>26.02<br>25.71<br>25.47<br>25.24<br>28.31<br>27.68<br>27.13<br>26.65<br>26.18<br>25.71  | 271/8<br>263/4<br>263/8<br>26<br>253/4<br>251/2<br>251/4<br>281/4<br>275/8<br>271/8<br>265/8<br>261/8<br>253/4  | 1.260<br>1.160<br>1.040<br>0.960<br>0.870<br>0.810<br>0.750<br>1.950<br>1.790<br>1.630<br>1.500<br>1.360  | 11/4<br>13/16<br>11/16<br>1<br>7/8<br>13/16<br>3/4<br>2<br>113/16<br>15/8<br>11/2<br>13/8  | 5/8<br>5/8<br>9/16<br>1/2<br>7/16<br>3/8<br>1<br>1<br>13/16<br>3/4<br>11/16   | 13.520<br>13.405<br>13.305<br>13.185<br>13.110<br>13.010<br>12.950<br>12.890<br>13.050<br>12.890<br>12.735<br>12.595                     | 131/ <sub>2</sub><br>133/ <sub>8</sub><br>131/ <sub>4</sub><br>131/ <sub>8</sub><br>13 13<br>12 <sup>7</sup> / <sub>8</sub><br>13<br>12 <sup>7</sup> / <sub>8</sub><br>12 <sup>3</sup> / <sub>4</sub><br>12 <sup>5</sup> / <sub>8</sub>  | 2.480<br>2.280<br>2.090<br>1.890<br>1.730<br>1.570<br>1.460<br>1.340<br>3.520<br>3.210<br>2.930<br>2.700   | 21/2<br>21/4<br>21/16<br>17/8<br>13/4<br>19/16<br>15/16<br>31/2<br>33/16<br>215/16<br>211/16   | 21<br>21<br>21<br>21<br>21<br>21<br>21<br>21<br>18 <sup>3</sup> / <sub>4</sub><br>18 <sup>3</sup> / <sub>4</sub><br>18 <sup>3</sup> / <sub>4</sub>       | 31/4<br>31/16<br>27/8<br>211/16<br>21/2<br>23/8<br>21/4<br>21/8<br>43/4<br>47/16<br>43/16  | 11/4<br>13/1<br>11/8<br>11/8<br>1<br>1<br>1<br>15/<br>21/E<br>2<br>115/<br>17/E  | 3355<br>306<br>279<br>250<br>229<br>207<br>192<br>176<br>457<br>414<br>875<br>343  | 2.7<br>2.9<br>3.2<br>3.5<br>3.8<br>4.1<br>4.4<br>4.8<br>1.9<br>2.0<br>2.2<br>2.3  |   |
| 82.0<br>73.5<br>67.2<br>60.7<br>56.3<br>51.7<br>134.0<br>121.0<br>110.0<br>91.2<br>82.1<br>74.4  | 26.73<br>26.34<br>26.02<br>25.71<br>25.47<br>25.24<br>28.31<br>27.68<br>27.13<br>26.65<br>26.18<br>25.71   | 263/ <sub>4</sub><br>263/ <sub>8</sub><br>26<br>253/ <sub>4</sub><br>251/ <sub>2</sub><br>251/ <sub>4</sub><br>281/ <sub>4</sub><br>275/ <sub>8</sub><br>271/ <sub>8</sub><br>265/ <sub>8</sub><br>261/ <sub>8</sub><br>253/ <sub>4</sub>   | 1.160<br>1.040<br>0.960<br>0.870<br>0.810<br>0.750<br>1.950<br>1.790<br>1.630<br>1.500<br>1.360   | 13/16<br>11/16<br>1<br>7/8<br>13/16<br>3/4<br>2<br>113/16<br>15/8<br>11/2<br>13/8  | 5/8<br>5/8<br>9/16<br>1/2<br>7/16<br>3/8<br>1<br>1<br>13/16<br>3/4<br>11/16   | 13.405<br>13.305<br>13.185<br>13.110<br>13.010<br>12.950<br>12.890<br>13.050<br>12.890<br>12.735<br>12.595                               | 133/8<br>131/4<br>131/8<br>13<br>13<br>127/8<br>13<br>127/8<br>123/4<br>125/8  | 2.280<br>2.090<br>1.890<br>1.730<br>1.570<br>1.460<br>1.340<br>3.520<br>3.210<br>2.930<br>2.700  | 21/ <sub>4</sub><br>21/ <sub>16</sub><br>17/ <sub>8</sub><br>13/ <sub>4</sub><br>19/ <sub>16</sub><br>17/ <sub>16</sub><br>15/ <sub>16</sub><br>31/ <sub>2</sub><br>33/ <sub>16</sub><br>215/ <sub>16</sub><br>211/ <sub>16</sub>  | 21<br>21<br>21<br>21<br>21<br>21<br>21<br>21<br>21<br>18 <sup>3</sup> / <sub>4</sub><br>18 <sup>3</sup> / <sub>4</sub><br>18 <sup>3</sup> / <sub>4</sub> | 31/16<br>27/8<br>211/16<br>21/2<br>23/8<br>21/4<br>21/8<br>43/4<br>47/16<br>43/16  | 13/ <sub>1</sub><br>11/ <sub>8</sub><br>11/ <sub>8</sub><br>1<br>1<br>1<br>15/<br>21/ <sub>£</sub><br>2<br>115/<br>17/ <sub>{</sub>  | 306<br>279<br>250<br>229<br>207<br>192<br>176<br>457<br>414<br>375<br>343  | 2.9<br>3.2<br>3.5<br>3.8<br>4.1<br>4.4<br>4.8<br>1.9<br>2.0<br>2.2<br>2.3   |   |
| 73.5<br>67.2<br>60.7<br>56.3<br>51.7<br>134.0<br>121.0<br>110.0<br>100.0<br>91.2<br>82.1<br>74.4   | 26.34<br>26.02<br>25.71<br>25.47<br>25.24<br>28.31<br>27.68<br>27.13<br>26.65<br>26.18<br>25.71  | 263/8<br>26<br>253/4<br>251/2<br>251/4<br>281/4<br>275/8<br>271/8<br>265/8<br>261/8<br>253/4  | 1.040<br>0.960<br>0.870<br>0.810<br>0.750<br>1.950<br>1.790<br>1.630<br>1.500<br>1.360  | 11/16<br>1<br>7/8<br>13/16<br>3/4<br>2<br>113/16<br>15/8<br>11/2<br>13/8   | 9/16<br>1/2<br>7/16<br>3/8<br>1<br>1<br>1<br>13/16<br>3/4<br>11/16  | 13.305<br>13.185<br>13.110<br>13.010<br>12.950<br>12.890<br>13.050<br>12.890<br>12.735<br>12.595   | 131/ <sub>4</sub><br>131/ <sub>8</sub><br>131/ <sub>8</sub><br>13<br>12 <sup>7</sup> / <sub>8</sub><br>13<br>12 <sup>7</sup> / <sub>8</sub><br>12 <sup>3</sup> / <sub>4</sub><br>12 <sup>5</sup> / <sub>8</sub>  | 2.090<br>1.890<br>1.730<br>1.570<br>1.460<br>1.340<br>3.520<br>3.210<br>2.930<br>2.700   | 21/16<br>17/8<br>13/4<br>19/16<br>17/16<br>15/16<br>31/2<br>33/16<br>215/16<br>211/16  | 21<br>21<br>21<br>21<br>21<br>21<br>21<br>21<br>18 <sup>3</sup> / <sub>4</sub><br>18 <sup>3</sup> / <sub>4</sub><br>18 <sup>3</sup> / <sub>4</sub>       | 27/8<br>211/16<br>21/2<br>23/8<br>21/4<br>21/8<br>43/4<br>47/16<br>43/16   | 11/8<br>11/8<br>1<br>1<br>1<br>15/<br>21/E<br>2<br>115/<br>17/{  | 279<br>250<br>229<br>207<br>192<br>176<br>457<br>414<br>375<br>343   | 3.2<br>3.5<br>3.8<br>4.1<br>4.4<br>4.8<br>1.9<br>2.0<br>2.2<br>2.3  |   |
| 67.2<br>60.7<br>56.3<br>51.7<br>134.0<br>121.0<br>110.0<br>100.0<br>91.2<br>82.1<br>74.4   | 26.02<br>25.71<br>25.47<br>25.24<br>28.31<br>27.68<br>27.13<br>26.65<br>26.18<br>25.71   | 26<br>25 <sup>3</sup> / <sub>4</sub><br>25 <sup>1</sup> / <sub>2</sub><br>25 <sup>1</sup> / <sub>4</sub><br>28 <sup>1</sup> / <sub>4</sub><br>27 <sup>5</sup> / <sub>8</sub><br>27 <sup>1</sup> / <sub>8</sub><br>26 <sup>5</sup> / <sub>8</sub><br>26 <sup>1</sup> / <sub>8</sub><br>25 <sup>3</sup> / <sub>4</sub>  | 0.960<br>0.870<br>0.810<br>0.750<br>1.950<br>1.630<br>1.500<br>1.360  | 1<br>7/8<br>13/16<br>3/4<br>2<br>113/16<br>15/8<br>11/2<br>13/8  | 9/16<br>1/2<br>7/16<br>3/8<br>1<br>1<br>1<br>13/16<br>3/4<br>11/16  | 13.185<br>13.110<br>13.010<br>12.950<br>12.890<br>13.050<br>12.890<br>12.735<br>12.595   | 131/8<br>131/8<br>13<br>13<br>127/8<br>13<br>127/8<br>123/4<br>125/8   | 1.890<br>1.730<br>1.570<br>1.460<br>1.340<br>3.520<br>3.210<br>2.930<br>2.700  | 17/8<br>13/4<br>19/16<br>17/16<br>15/16<br>31/2<br>33/16<br>215/16<br>211/16   | 21<br>21<br>21<br>21<br>21<br>21<br>18 <sup>3</sup> / <sub>4</sub><br>18 <sup>3</sup> / <sub>4</sub><br>18 <sup>3</sup> / <sub>4</sub>                   | 211/ <sub>16</sub><br>21/ <sub>2</sub><br>23/ <sub>8</sub><br>21/ <sub>4</sub><br>21/ <sub>8</sub><br>43/ <sub>4</sub><br>47/ <sub>16</sub><br>43/ <sub>16</sub><br>4                                | 11/8<br>1<br>1<br>1<br>15/<br>21/ <sub>£</sub><br>2<br>115/<br>17/ <sub>{</sub>  | 250<br>229<br>207<br>192<br>176<br>457<br>414<br>375<br>343  | 3.5<br>3.8<br>4.1<br>4.4<br>4.8<br>1.9<br>2.0<br>2.2<br>2.3   |   |
| 60.7<br>56.3<br>51.7<br>134.0<br>121.0<br>110.0<br>100.0<br>91.2<br>82.1<br>74.4   | 25.71<br>25.47<br>25.24<br>28.31<br>27.68<br>27.13<br>26.65<br>26.18<br>25.71  | 25 <sup>3</sup> / <sub>4</sub><br>25 <sup>1</sup> / <sub>2</sub><br>25 <sup>1</sup> / <sub>4</sub><br>28 <sup>1</sup> / <sub>4</sub><br>27 <sup>5</sup> / <sub>8</sub><br>27 <sup>1</sup> / <sub>8</sub><br>26 <sup>5</sup> / <sub>8</sub><br>26 <sup>1</sup> / <sub>8</sub><br>25 <sup>3</sup> / <sub>4</sub>  | 0.870<br>0.810<br>0.750<br>1.950<br>1.790<br>1.630<br>1.500<br>1.360  | 1<br>7/8<br>13/16<br>3/4<br>2<br>113/16<br>15/8<br>11/2<br>13/8  | 1/2<br>7/16<br>7/16<br>3/8<br>1<br>1<br>13/16<br>3/4<br>11/16   | 13.110<br>13.010<br>12.950<br>12.890<br>13.050<br>12.890<br>12.735<br>12.595   | 13 <sup>1</sup> / <sub>8</sub> 13 13 12 <sup>7</sup> / <sub>8</sub> 13 12 <sup>7</sup> / <sub>8</sub> 12 <sup>3</sup> / <sub>4</sub> 12 <sup>5</sup> / <sub>8</sub>  | 1.730<br>1.570<br>1.460<br>1.340<br>3.520<br>3.210<br>2.930<br>2.700   | 13/ <sub>4</sub><br>19/ <sub>16</sub><br>17/ <sub>16</sub><br>15/ <sub>16</sub><br>31/ <sub>2</sub><br>33/ <sub>16</sub><br>215/ <sub>16</sub><br>211/ <sub>16</sub>   | 21<br>21<br>21<br>21<br>21<br>18 <sup>3</sup> / <sub>4</sub><br>18 <sup>3</sup> / <sub>4</sub><br>18 <sup>3</sup> / <sub>4</sub>                         | 21/ <sub>2</sub><br>23/ <sub>8</sub><br>21/ <sub>4</sub><br>21/ <sub>8</sub><br>43/ <sub>4</sub><br>47/ <sub>16</sub><br>43/ <sub>16</sub><br>4  | 1<br>1<br>1<br>15/<br>21/ <sub>E</sub><br>2<br>115/<br>17/ <sub>E</sub>  | 229<br>207<br>192<br>176<br>457<br>414<br>375<br>343   | 3.8<br>4.1<br>4.4<br>4.8<br>1.9<br>2.0<br>2.2<br>2.3  |   |
| 56.3<br>51.7<br>134.0<br>121.0<br>110.0<br>100.0<br>91.2<br>82.1<br>74.4   | 25.47<br>25.24<br>28.31<br>27.68<br>27.13<br>26.65<br>26.18<br>25.71   | 251/ <sub>2</sub><br>251/ <sub>4</sub><br>281/ <sub>4</sub><br>275/ <sub>8</sub><br>271/ <sub>8</sub><br>265/ <sub>8</sub><br>261/ <sub>8</sub><br>253/ <sub>4</sub>  | 0.810<br>0.750<br>1.950<br>1.790<br>1.630<br>1.500<br>1.360   | 13/ <sub>16</sub> 3/ <sub>4</sub> 2 113/ <sub>16</sub> 15/ <sub>8</sub> 11/ <sub>2</sub> 13/ <sub>8</sub>  | 7/16<br>7/16<br>3/8<br>1<br>1<br>13/16<br>3/4<br>11/16  | 13.010<br>12.950<br>12.890<br>13.050<br>12.890<br>12.735<br>12.595   | 13<br>13<br>12 <sup>7</sup> / <sub>8</sub><br>13<br>12 <sup>7</sup> / <sub>8</sub><br>12 <sup>3</sup> / <sub>4</sub><br>12 <sup>5</sup> / <sub>8</sub>   | 1.570<br>1.460<br>1.340<br>3.520<br>3.210<br>2.930<br>2.700  | 19/16<br>17/16<br>15/16<br>31/2<br>33/16<br>215/16<br>211/16   | 21<br>21<br>21<br>18 <sup>3</sup> / <sub>4</sub><br>18 <sup>3</sup> / <sub>4</sub><br>18 <sup>3</sup> / <sub>4</sub>                                     | 2 <sup>3</sup> / <sub>8</sub><br>2 <sup>1</sup> / <sub>4</sub><br>2 <sup>1</sup> / <sub>8</sub><br>4 <sup>3</sup> / <sub>4</sub><br>4 <sup>7</sup> / <sub>16</sub><br>4 <sup>3</sup> / <sub>16</sub> | 1<br>1<br>15/<br>21/ <sub>E</sub><br>2<br>115/<br>17/ <sub>E</sub>   | 207<br>192<br>176<br>457<br>414<br>375<br>343  | 4.1<br>4.4<br>4.8<br>1.9<br>2.0<br>2.2<br>2.3   |   |
| 51.7<br>134.0<br>121.0<br>110.0<br>100.0<br>91.2<br>82.1<br>74.4   | 25.24<br>28.31<br>27.68<br>27.13<br>26.65<br>26.18<br>25.71  | 251/ <sub>4</sub> 281/ <sub>4</sub> 275/ <sub>8</sub> 271/ <sub>8</sub> 265/ <sub>8</sub> 261/ <sub>8</sub> 253/ <sub>4</sub>   | 0.810<br>0.750<br>1.950<br>1.790<br>1.630<br>1.500<br>1.360   | 13/ <sub>16</sub> 3/ <sub>4</sub> 2 113/ <sub>16</sub> 15/ <sub>8</sub> 11/ <sub>2</sub> 13/ <sub>8</sub>  | 7/16<br>3/8<br>1<br>1<br>1<br>13/16<br>3/4<br>11/16   | 12.950<br>12.890<br>13.050<br>12.890<br>12.735<br>12.595   | 13<br>12 <sup>7</sup> / <sub>8</sub><br>13<br>12 <sup>7</sup> / <sub>8</sub><br>12 <sup>3</sup> / <sub>4</sub><br>12 <sup>5</sup> / <sub>8</sub>   | 1.460<br>1.340<br>3.520<br>3.210<br>2.930<br>2.700   | 17/16<br>15/16<br>31/2<br>33/16<br>215/16<br>211/16  | 21<br>21<br>18 <sup>3</sup> / <sub>4</sub><br>18 <sup>3</sup> / <sub>4</sub><br>18 <sup>3</sup> / <sub>4</sub>   | 2 <sup>1</sup> / <sub>4</sub><br>2 <sup>1</sup> / <sub>8</sub><br>4 <sup>3</sup> / <sub>4</sub><br>4 <sup>7</sup> / <sub>16</sub><br>4 <sup>3</sup> / <sub>16</sub>                                  | 1<br>15/<br>21/ <sub>E</sub><br>2<br>115/<br>17/ <sub>E</sub>  | 192<br>176<br>457<br>414<br>375<br>343   | 4.4<br>4.8<br>1.9<br>2.0<br>2.2<br>2.3  |   |
| 134.0<br>121.0<br>110.0<br>100.0<br>91.2<br>82.1<br>74.4   | 28.31<br>27.68<br>27.13<br>26.65<br>26.18<br>25.71   | 251/ <sub>4</sub> 281/ <sub>4</sub> 275/ <sub>8</sub> 271/ <sub>8</sub> 265/ <sub>8</sub> 261/ <sub>8</sub> 253/ <sub>4</sub>   | 1.950<br>1.790<br>1.630<br>1.500<br>1.360   | 3/ <sub>4</sub> 2 113/ <sub>16</sub> 15/ <sub>8</sub> 11/ <sub>2</sub> 13/ <sub>8</sub>  | 3/8<br>1<br>1<br>13/16<br>3/4<br>11/16  | 12.890<br>13.050<br>12.890<br>12.735<br>12.595   | 12 <sup>7</sup> / <sub>8</sub> 13 12 <sup>7</sup> / <sub>8</sub> 12 <sup>3</sup> / <sub>4</sub> 12 <sup>5</sup> / <sub>8</sub>   | 3.520<br>3.210<br>2.930<br>2.700   | 15/ <sub>16</sub> 31/ <sub>2</sub> 33/ <sub>16</sub> 215/ <sub>16</sub> 211/ <sub>16</sub>   | 21<br>18 <sup>3</sup> / <sub>4</sub><br>18 <sup>3</sup> / <sub>4</sub><br>18 <sup>3</sup> / <sub>4</sub>   | 2 <sup>1</sup> / <sub>8</sub> 4 <sup>3</sup> / <sub>4</sub> 4 <sup>7</sup> / <sub>16</sub> 4 <sup>3</sup> / <sub>16</sub> 4  | 15/<br>21/ <sub>E</sub><br>2<br>115/<br>17/ <sub>E</sub>   | 176<br>457<br>414<br>375<br>343  | 1.9<br>2.0<br>2.2<br>2.3  |   |
| 121.0<br>110.0<br>100.0<br>91.2<br>82.1<br>74.4  | 27.68<br>27.13<br>26.65<br>26.18<br>25.71  | 27 <sup>5</sup> / <sub>8</sub><br>27 <sup>1</sup> / <sub>8</sub><br>26 <sup>5</sup> / <sub>8</sub><br>26 <sup>1</sup> / <sub>8</sub><br>25 <sup>3</sup> / <sub>4</sub>  | 1.790<br>1.630<br>1.500<br>1.360  | 113/ <sub>16</sub><br>15/ <sub>8</sub><br>11/ <sub>2</sub><br>13/ <sub>8</sub>   | 1<br>13/16<br>3/4<br>11/16  | 12.890<br>12.735<br>12.595   | 12 <sup>7</sup> / <sub>8</sub><br>12 <sup>3</sup> / <sub>4</sub><br>12 <sup>5</sup> / <sub>8</sub>   | 3.210<br>2.930<br>2.700  | 3 <sup>3</sup> / <sub>16</sub><br>2 <sup>15</sup> / <sub>16</sub><br>2 <sup>11</sup> / <sub>16</sub>   | 18 <sup>3</sup> / <sub>4</sub><br>18 <sup>3</sup> / <sub>4</sub><br>18 <sup>3</sup> / <sub>4</sub>   | 4 <sup>7</sup> / <sub>16</sub><br>4 <sup>3</sup> / <sub>16</sub><br>4  | 2<br>115,<br>17/ <sub>{</sub>  | 414<br>375<br>343  | 2.0<br>2.2<br>2.3   | -   |
| 110.0<br>100.0<br>91.2<br>82.1<br>74.4   | 27.13<br>26.65<br>26.18<br>25.71   | 27 <sup>1</sup> / <sub>8</sub><br>26 <sup>5</sup> / <sub>8</sub><br>26 <sup>1</sup> / <sub>8</sub><br>25 <sup>3</sup> / <sub>4</sub>  | 1.630<br>1.500<br>1.360   | 15/ <sub>8</sub><br>11/ <sub>2</sub><br>13/ <sub>8</sub>   | 13/ <sub>16</sub><br>3/ <sub>4</sub><br>11/ <sub>16</sub>   | 12.735<br>12.595   | 12 <sup>3</sup> / <sub>4</sub><br>12 <sup>5</sup> / <sub>8</sub>   | 3.210<br>2.930<br>2.700  | 3 <sup>3</sup> / <sub>16</sub><br>2 <sup>15</sup> / <sub>16</sub><br>2 <sup>11</sup> / <sub>16</sub>   | 18 <sup>3</sup> / <sub>4</sub><br>18 <sup>3</sup> / <sub>4</sub><br>18 <sup>3</sup> / <sub>4</sub>   | 4 <sup>7</sup> / <sub>16</sub><br>4 <sup>3</sup> / <sub>16</sub><br>4  | 2<br>115,<br>17/ <sub>{</sub>  | 414<br>375<br>343  | 2.0<br>2.2<br>2.3   | -   |
| 100.0<br>91.2<br>82.1<br>74.4  | 26.65<br>26.18<br>25.71  | 26 <sup>5</sup> / <sub>8</sub><br>26 <sup>1</sup> / <sub>8</sub><br>25 <sup>3</sup> / <sub>4</sub>  | 1.500<br>1.360  | 15/ <sub>8</sub><br>11/ <sub>2</sub><br>13/ <sub>8</sub>   | 13/ <sub>16</sub><br>3/ <sub>4</sub><br>11/ <sub>16</sub>   | 12.735<br>12.595   | 12 <sup>3</sup> / <sub>4</sub><br>12 <sup>5</sup> / <sub>8</sub>   | 2.930<br>2.700   | 2 <sup>15</sup> / <sub>16</sub><br>2 <sup>11</sup> / <sub>16</sub>   | 18 <sup>3</sup> / <sub>4</sub><br>18 <sup>3</sup> / <sub>4</sub>   | 43/16  | 115,   | 375<br>343   | 2.2   |   |
| 91.2<br>82.1<br>74.4   | 26.18<br>25.71   | 26 <sup>1</sup> / <sub>8</sub><br>25 <sup>3</sup> / <sub>4</sub>  | 1.360   | 13/8   | 3/ <sub>4</sub><br>11/ <sub>16</sub>  | 12.595   | 125/8  | 2.700  | 211/16   | 183/4  | 4 .  | 17/8   | 343  | 2.3   | -   |
| 82.1<br>74.4   | 25.71  | 253/4   |   |  | 11/16   |  |  |  |  |  |  |  |  |   |   |
| 74.4   |  |   | 1.240   | 11/.   |   |  |  | 2.460  | 27/16  | 183/4  | 311/16   | 113  |  | 2.5   | -   |
|  | 25 32  |   |   | 11/4   | 5/8   | 12.340   | 123/8  | 2.220  | 21/4   | 183/4  | 31/2   | 13/,   | 310<br>280   |   | -   |
| 67.0   | 20.02  | 253/8   | 1.120   | 11/8   | 9/16  | 12.225   | 121/4  | 2.030  | 2  | 183/4  | 35/16  | 111  |  | 2.8   | -   |
| 07.0   | 24.92  | 247/8   | 1.020   | 1  | 1/2   | 12.125   | 121/8  | 1.830  |  | 183/4  | 31/16  | 15/  | 253  | 3.0   | -   |
| 60.9   | 24.61  | 245/8   | 0.930   | 15/16  |   | 12.025   | 12   | 1.670  | 111/16   |  | 215/16   | 19/  | 228<br>207   | 3.3   | -   |
| 55.3   | 24.29  | 241/4   | 0.850   | 7/8  | 7/16  | 11.945   | 12   | 1.520  | 11/2   | 183/4  | 23/4   | 19/  | 188  | 3.6   |   |
| 103.0  | 28.86  | 287/8   | 1.750   | 13/4   | 7/8   | 10.200   | 101/4  | 3.150  | 31/8   | 21   | 315/10   | 13/  | 15.6   | 10  |   |
| 93.7   | 28.31  | 281/4   | 1.590   | 19/16  | 13/16   | 10.040   | 10   | 2.870  |  | 21   |  |  |  |   | -   |
|  | 27.84  | 277/8   | 1.460   | 17/16  | 3/4   | 9.905  | 97/8   | 2.640  |  |  |  |  |  |   | -   |
|  | 27.36  | 273/8   | 1.340   | 15/16  | 11/16   | 9.795  | 93/4   |  |  |  |  |  |  |   | -   |
|  | 26.97  | 27  | 1.220   | 11/4   | 5/8   | 9.670  |  |  |  |  |  |  |  |   | -   |
|  | 26.58  | 265/8   | 1.120   | 11/8   | 9/16  | 9.570  | 95/8   | 2.010  |  | 21   |  |  |  |   | -   |
|  | 26.26  | 261/4   | 1.020   | 1  | 1/2   | 9.470  | 91/2   |  |  |  |  | -  |  |   | -   |
|  | 25.95  | 26  | 0.940   | 1  | 1/2   | 9.390  | 93/8   | 1.690  |  |  |  |  |  |   | -   |
|  |  | 255/8   | 0.850   | 7/8  | 7/16  | 9.290  | 91/4   | 1.540  |  |  |  |  |  |   | -   |
| 43.0   | 25.32  | 253/8   | 0.770   | 3/4  | 3/8   | 9.215  | -  |  |  |  |  |  |  |   |   |
| 37.6   | 25.00  | 25  | 0.670   | 11/16  | 3/8   | 9.115  |  |  |  |  |  | _  |  |   |   |
|  | 24.76  | 243/4   | 0.610   | 5/8  | 5/16  | 9.055  | 9  |  |  |  |  | _  | ton  |   |   |
| 30.3   | 24.53  | 241/2   | 0.550   | 9/16   | 5/16  | 9.000  | 9  | 0.980  | 1  | 21   | 13/4   | 15   |  |   |   |
|  | 93.7<br>85.5<br>77.5<br>70.3<br>64.0<br>58.3<br>53.2<br>48.0<br>43.0   | 93.7 28.31<br>85.5 27.84<br>77.5 27.36<br>70.3 26.97<br>64.0 26.58<br>58.3 26.26<br>53.2 25.95<br>48.0 25.63<br>43.0 25.32<br>37.6 25.00<br>33.9 24.76  | 93.7 28.31 281/4<br>85.5 27.84 277/8<br>77.5 27.36 273/8<br>70.3 26.97 27<br>64.0 26.58 265/8<br>58.3 26.26 261/4<br>53.2 25.95 26<br>48.0 25.63 255/8<br>43.0 25.32 253/8<br>37.6 25.00 25<br>33.9 24.76 243/4 | 93.7         28.31         281/4         1.590           85.5         27.84         277/8         1.460           77.5         27.36         273/8         1.340           70.3         26.97         27         1.220           64.0         26.58         265/8         1.120           53.2         25.95         26         0.940           48.0         25.63         255/8         0.850           43.0         25.32         253/8         0.770           37.6         25.00         25         0.670           33.9         24.76         243/4         0.610 | 93.7 28.31 281/4 1.590 19/16<br>85.5 27.84 277/8 1.460 17/16<br>77.5 27.36 273/8 1.340 15/16<br>70.3 26.97 27 1.220 11/4<br>64.0 26.58 265/8 1.120 11/8<br>58.3 26.26 261/4 1.020 1<br>53.2 25.95 26 0.940 1<br>48.0 25.63 255/8 0.850 7/8<br>43.0 25.32 253/8 0.770 3/4<br>37.6 25.00 25 0.670 11/16<br>33.9 24.76 243/4 0.610 5/8 | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | 93.7 28.31 2814 1.590 1916 1916 10.040 85.5 27.84 277/8 1.460 17/16 3/4 9.905 77.5 27.36 273/8 1.340 15/16 11/16 9.795 70.3 26.97 27 1.220 11/4 5/8 9.670 64.0 26.58 265/8 1.120 11/8 9/16 9.570 58.3 26.26 261/4 1.020 1 1/2 9.470 53.2 25.95 26 0.940 1 1/2 9.390 48.0 25.63 255/8 0.850 7/8 7/16 9.290 48.0 25.32 253/8 0.770 3/4 3/8 9.215 37.6 25.00 25 0.670 11/16 3/8 9.115 33.9 24.76 243/4 0.610 5/8 5/16 9.055 | 93.7 28.31 2814 1.590 1916 1916 10.040 10 85.5 27.84 277/8 1.460 17/16 3/4 9.905 97/8 77.5 27.36 273/8 1.340 15/16 11/16 9.795 93/4 70.3 26.97 27 1.220 11/4 5/8 9.670 95/8 64.0 26.58 265/8 1.120 11/8 9/16 9.570 95/8 58.3 26.26 261/4 1.020 1 1/2 9.470 91/2 53.2 25.95 26 0.940 1 1/2 9.390 93/8 48.0 25.63 255/8 0.850 7/8 7/16 9.290 91/4 43.0 25.32 253/8 0.770 3/4 3/8 9.215 91/4 37.6 25.00 25 0.670 11/16 3/8 9.115 91/8 33.9 24.76 243/4 0.610 5/8 5/16 9.055 9 | 93.7 28.31 281/4 1.590 19/16 13/16 10.040 10 2.870 85.5 27.84 277/8 1.460 17/16 3/4 9.905 97/8 2.640 77.5 27.36 273/8 1.340 19/16 11/16 9.795 93/4 2.400 9.658 26.57 1.220 11/4 5/8 9.670 95/8 2.200 9.658 2.65/8 1.120 11/8 9/16 9.570 95/8 2.010 9.658 2.65/8 1.120 11/8 9/16 9.570 95/8 2.010 9.658 2.65/8 1.120 11/8 9/16 9.570 95/8 2.010 9.658 2.65/8 0.850 7/8 7/16 9.290 93/8 1.690 9.670 9.57 | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | $\begin{array}{cccccccccccccccccccccccccccccccccccc$   | 93.7 28.31 2814 1.590 19/16 13/16 10.040 10 2.870 27/8 21 35/16 85.5 27.84 277/8 1.460 17/16 3/4 9.905 97/8 2.640 25/8 21 35/16 77.5 27.36 273/8 1.340 15/16 11/16 9.795 93/4 2.400 23/8 21 33/16 33/16 26.97 27 1.220 11/4 5/8 9.670 95/8 2.200 23/16 21 33/16 26.00 26.58 265/8 1.120 11/8 9/16 9.570 95/8 2.200 23/16 21 3 3/16 25.83 26.26 261/4 1.020 1 1/8 9/16 9.570 95/8 2.010 2 21 213/16 25.32 25.95 26 0.940 1 1/2 9.470 91/2 1.850 17/8 21 25/16 25.20 25/16 0.850 7/8 7/16 9.290 91/4 1.540 11/16 21 21/2 43/16 25.63 255/8 0.850 7/8 7/16 9.290 91/4 1.540 11/16 21 25/16 37.6 25.00 25 0.670 11/16 3/8 9.215 91/4 1.380 13/8 21 23/16 33.9 24.76 243/4 0.610 5/8 5/16 9.055 9 1.100 11/8 21 17/8  | 93.7 28.31 281/4 1.590 19/16 13/16 10.040 10 2.870 27/8 21 35/16 13/ 85.5 27.84 277/8 1.460 17/16 3/4 9.905 97/8 2.640 25/8 21 37/16 15/ 77.5 27.36 273/8 1.340 15/16 11/16 9.795 93/4 2.400 23/8 21 33/16 15/ 70.3 26.97 27 1.220 11/4 5/8 9.670 95/8 2.200 23/16 21 33/16 11/ 58.3 26.26 265/8 1.120 11/8 9/16 9.570 95/8 2.200 23/16 21 3 13/ 58.3 26.26 261/4 1.020 1 1/2 9.470 91/2 1.850 17/8 21 25/8 11/ 53.2 25.95 26 0.940 1 1/2 9.390 93/8 1.690 111/16 21 25/8 11/ 43.0 25.63 255/8 0.850 7/8 7/16 9.290 91/4 1.540 19/16 21 25/16 11/ 43.0 25.32 253/8 0.770 3/4 3/8 9.215 91/4 1.380 13/8 21 23/16 15/ 37.6 25.00 25 0.670 11/16 3/8 9.115 91/8 1.220 11/8 21 23/16 15/ 33.9 24.76 243/4 0.650 5/8 5/16 9.055 9 1.100 11/8 21 17/8 7/ | 93.7 28.31 281/4 1.590 19/16 13/16 10.040 10 2.870 27/8 21 35/16 13/ 18 85.5 27.84 277/8 1.460 17/16 3/4 9.905 97/8 2.640 25/8 21 37/16 15/ 21 77.5 27.36 273/8 1.340 15/16 11/16 9.795 93/4 2.400 23/8 21 33/16 15/ 21 64.0 26.58 26.58 1.120 11/8 9/16 9.570 95/8 2.000 23/16 21 33/16 11/ 28 85.3 26.26 261/4 1.020 1 1/2 9.470 91/2 1.850 17/8 21 25/8 11/ 28 85.3 26.26 261/4 1.020 1 1/2 9.470 91/2 1.850 17/8 21 25/8 11/ 38 86.0 25.63 255/8 0.850 7/8 7/16 9.290 91/4 1.340 11/16 21 25/16 1 31 87.6 25.00 25 0.670 11/16 3/8 9.215 91/4 1.380 13/8 21 23/16 11 31 87.6 25.00 25 0.670 11/16 3/8 9.215 91/4 1.380 13/8 21 23/16 1 31 87.6 25.00 25 0.670 11/16 3/8 9.115 91/8 1.220 11/4 21 2 7/ 28 87.6 24.76 243/4 0.610 5/8 5/16 9.055 9 1/8 1.220 11/8 21 17/8 7/ 18 87.6 24.76 243/4 0.610 5/8 5/16 9.055 9 1.100 11/8 21 17/8 7/ 18 87.6 24.76 243/4 0.610 5/8 5/16 9.055 9 1.100 11/8 21 17/8 7/ 18 87.6 24.76 243/4 0.610 5/8 5/16 9.005 9 0.000 11/8 21 17/8 7/ 18 87.6 24.76 243/4 0.610 5/8 5/16 9.005 9 0.000 11/8 21 17/8 7/ 18 | 93.7 28.31 281/4 1.590 19/16 13/16 10.040 10 2.870 27/8 21 35/16 13/ 18 15 85.5 27.84 277/8 1.460 17/16 3/4 9.905 97/8 2.640 25/8 21 37/16 13/ 18 17 77.5 27.36 27/8 1.340 15/16 11/16 9.795 93/4 2.400 23/8 21 33/16 15/ 28 17 70.3 26.97 27 1.220 11/4 5/8 9.670 95/8 2.200 23/16 21 33/16 11/ 18 20 24 20 26.58 26.58 1.120 11/8 9/16 9.570 95/8 2.200 23/16 21 33/16 11/ 18 20 20 20 20/16 21 21 21/16 11/ 18 20 20 20/16 21 20 20/16 21 20 20/16 21 20 20/16 21 |

BEAMS

# TAILOR-MADE WIDE FLANGE BEAMS Properties



| 31/4 21<br>3 21<br>22/4 21<br>21/2 21<br>21/4 21<br>21/4 21<br>21/4 21<br>21/4 21<br>13/4 18/4<br>21/4 21/4<br>21/4 21/4<br>21/4<br>21/4 21/4<br>21/4 21/4<br>21/4 21/4<br>21/4 21/4<br>21/4 21/4<br>21/4 21/ | 45/<br>41/<br>33/<br>31/<br>31/<br>31/<br>21/<br>21/<br>23/<br>21/<br>21/<br>21/<br>21/<br>21/<br>21/<br>21/<br>21/<br>21/<br>21 | 15/16 19/9<br>11/16 11/2<br>13/4 13/8<br>13/2 15/9<br>13/4 13/4<br>13/14 13/9<br>13/14 13/9<br>13/16 13/   | Wt. per Ft. 492 450 408 370 335 306 279 250 229 176                       | 2.0<br>2.1<br>2.3<br>2.5<br>2.7<br>2.9<br>3.2<br>3.5<br>3.8 | Ksi  | 15.1<br>16.1<br>17.3<br>18.4<br>19.9<br>21.5 | <i>F</i> <sub>y</sub> " Ksi | In. 3.80 3.76 3.71   | 0.59<br>0.64 | In.4 19100 17100 | Axis X-X<br>S<br>In.3 | r In. | I<br>In.4 | Axis Y-Y S In.3 | r<br>In. | con<br>stant<br>J | Z <sub>x</sub> | $Z_y$ In. <sup>3</sup> |
|--|--|--|---|---|------|--|-----------------------------|----------------------|--------------|------------------|-----------------------|-------|-----------|-----------------|----------|-------------------|----------------|------------------------|
| In. In.  39/16 21 31/4 21 3 21 3 21 22/4 21 22/4 21 12/8 21 11/8 21 13/8 21 13/8 21 13/8 21 13/8 21 13/8 21 13/8 21 13/8 18/8 13/8 21 13/8 18/8 13/8 21 27/8 21 25/8 21  | 45/<br>41/<br>33/<br>31/<br>31/<br>31/<br>21/<br>21/<br>23/<br>21/<br>21/<br>21/<br>21/<br>21/<br>21/<br>21/<br>21/<br>21/<br>21 | 15/16 19/9<br>11/16 11/2<br>13/4 13/8<br>13/2 15/9<br>13/4 13/4<br>13/14 13/9<br>13/14 13/9<br>13/16 13/   | 492<br>450<br>408<br>370<br>335<br>306<br>279<br>250<br>229<br>207<br>192 | 2.0<br>2.1<br>2.3<br>2.5<br>2.7<br>2.9<br>3.2<br>3.5<br>3.8 | Ksi  | 15.1<br>16.1<br>17.3<br>18.4<br>19.9<br>21.5 | Ksi<br>-<br>-               | 3.80<br>3.76<br>3.71 | 0.59         | In.4<br>19100    | In.3                  | In.   |           |                 |          | J                 | In.3           | In.3                   |
| 39/16 21<br>31/4 21<br>3 21<br>29/4 21<br>21/2 21<br>21/4 21<br>21/4 21<br>17/8 21<br>17/8 21<br>19/16 21<br>17/16 21<br>15/16 21<br>31/2 183/4<br>21/3 183/4<br>21/16 183/4<br>21/16 183/4<br>21/16 183/4<br>21/16 183/4<br>21/17 21/17 183/4<br>21/17 2   | 45/41/<br>33/31/31/<br>31/31/<br>31/21/<br>21/21/<br>23/21/<br>21/23/<br>21/33/4 43/3/4  | 15/16 19/9<br>11/16 11/2<br>13/4 13/8<br>13/2 15/9<br>13/4 13/4<br>13/14 13/9<br>13/14 13/9<br>13/16 13/   | 492<br>450<br>408<br>370<br>335<br>306<br>279<br>250<br>229<br>207<br>192 | 2.1<br>2.3<br>2.5<br>2.7<br>2.9<br>3.2<br>3.5<br>3.8        |      | 15.1<br>16.1<br>17.3<br>18.4<br>19.9<br>21.5 | 8-3800                      | 3.80<br>3.76<br>3.71 | 0.64         | 19100            |                       |       | In.4      | In.3            | In.      | In.4              |                |                        |
| 31/4 21<br>3 21<br>22/4 21<br>21/4 21<br>21/4 21<br>21/4 21<br>21/4 21<br>21/4 21<br>12/4 21<br>13/4 21<br>23/8 21  | 41/<br>33/<br>31/<br>31/<br>31/<br>27/<br>211/<br>23/<br>21/<br>21/<br>21/<br>31/<br>43/   | 11/16 11/2<br>13/4 13/4<br>13/2 15/8<br>13/4 11/4<br>15/8<br>13/4 11/4<br>13/16 13/8<br>13/16 13/8<br>13/1 | 450<br>408<br>370<br>335<br>306<br>279<br>250<br>229<br>207<br>192        | 2.1<br>2.3<br>2.5<br>2.7<br>2.9<br>3.2<br>3.5<br>3.8        |      | 16.1<br>17.3<br>18.4<br>19.9<br>21.5         | 9 - 8<br>9 - 0<br>8 - 0     | 3.76<br>3.71         | 0.64         |                  | 1290                  | 44.5  |           |                 |          |                   |                |                        |
| 31/4 21<br>3 21<br>22/4 21<br>21/4 21<br>21/4 21<br>21/4 21<br>21/4 21<br>21/4 21<br>12/4 21<br>13/4 21<br>23/8 21  | 41/<br>33/<br>31/<br>31/<br>31/<br>27/<br>211/<br>23/<br>21/<br>21/<br>21/<br>31/<br>43/   | 11/16 11/2<br>13/4 13/4<br>13/2 15/8<br>13/4 11/4<br>15/8<br>13/4 11/4<br>13/16 13/8<br>13/16 13/8<br>13/1 | 450<br>408<br>370<br>335<br>306<br>279<br>250<br>229<br>207<br>192        | 2.1<br>2.3<br>2.5<br>2.7<br>2.9<br>3.2<br>3.5<br>3.8        |      | 16.1<br>17.3<br>18.4<br>19.9<br>21.5         | 9 - 8<br>9 - 0<br>8 - 0     | 3.76<br>3.71         | 0.64         |                  |                       |       | 1670      | 237             | 3.41     | 456               | 1550           | 375                    |
| 3 21 23/4 21 22/4 21 22/4 21 22/4 21 22/4 21 23/4 21 23/4 21 23/4 21 23/4 21 23/4 21 23/4 21 23/4 21 23/4 21 23/4 21 23/4 21 24 25/8 21 23/8 21  | 33/<br>31/<br>31/<br>31/<br>27/<br>211/<br>23/<br>21/<br>21/<br>21/<br>31/<br>43/  | 13/4 13/6<br>13/2 15/6<br>13/4 11/4<br>13/16 13/6<br>13/16 13/   | 408<br>370<br>335<br>306<br>279<br>250<br>229<br>207<br>192               | 2.3<br>2.5<br>2.7<br>2.9<br>3.2<br>3.5<br>3.8               |      | 17.3<br>18.4<br>19.9<br>21.5                 | S- 0                        | 3.71                 |              |                  | 1170                  | 11.4  | 1490      | 214             | 3.36     | 357               | 1410           | 337                    |
| 29/4 21<br>21/2 21<br>21/4 21<br>21/4 21<br>17/8 21<br>17/8 21<br>13/4 21<br>13/8 21<br>13/16 21<br>15/16 21<br>15/16 21<br>31/2 183/4<br>215/16 183/4<br>215/16 183/4<br>215/16 183/4<br>21/16 183/4<br>21/16 183/4<br>21/16 183/4<br>21/16 183/4<br>21/16 183/4<br>21/16 183/4<br>21/16 183/4<br>21/2 183/4<br>21/2 183/4<br>21/2 183/4<br>21/2 183/4<br>21/2 21/2 21/2 23/6<br>21 23/6 21<br>23/16 21   | 31/<br>31/<br>31/<br>27/<br>211/<br>23/<br>21/<br>21/<br>21/<br>3/ <sub>4</sub> 43/  | 31/2 15/5<br>31/4 11/4<br>31/16 13/6<br>31/16 13/6<br>31/16 11/1<br>21/2 1<br>21/2 1<br>21/2 1<br>21/2 1<br>21/4 1<br>21/8 15/6  | 370<br>335<br>306<br>279<br>250<br>229<br>207<br>192                      | 2.5<br>2.7<br>2.9<br>3.2<br>3.5<br>3.8                      | -    | 18.4<br>19.9<br>21.5                         | S- 0                        |                      | 0.69         | 15100            | 1060                  | 11.3  | 1320      | 191             | 3.33     | 271               | 1250           | 300                    |
| 21/2 21 21/4 21 21/4 21 21/15 21 11/8 21 11/8 21 11/8 21 11/16 21 11/16 21 11/16 21 11/16 21 11/16 21 11/16 21 11/16 21 11/16 21 11/16 18/14 21/1/16 18/14 21/1/16 18/14 21/1/16 18/14 21/1/16 18/14 21/1/16 18/14 21/1/16 18/14 21/1/16 18/14 21/1/16 18/14 21/1/16 18/14 21/1/16 18/14 21/1/16 18/14 21/1/16 18/14 21/1/16 18/14 21/1/16 18/14 21/1/16 18/14 21/1/16 18/14 21/16 21 21/16 2   | 31/<br>31/<br>27/<br>211/<br>23/<br>21/<br>21/<br>21/<br>31/4 43/  | 81/4 11/4<br>81/16 13/8<br>127/8 11/1<br>1211/16 11/8<br>121/2 1<br>123/8 1<br>121/4 1<br>121/8 15/8   | 335<br>306<br>279<br>250<br>229<br>207<br>192                             | 2.7<br>2.9<br>3.2<br>3.5<br>3.8                             | -    | 19.9<br>21.5                                 |                             | 3.67                 | 0.03         | 13400            | 957                   | 11.1  | 1160      | 170             | 3.28     | 205               | 1120           | 267                    |
| 21/4 21<br>21/16 21<br>11/4 21<br>11/4 21<br>11/4 21<br>11/4 21<br>11/4 21<br>11/16 21<br>11/16 21<br>11/16 21<br>11/16 21<br>11/16 21<br>11/16 21<br>11/16 18/14<br>11/16 18/14   | 31/<br>27/<br>211/<br>21/<br>23/<br>21/<br>21/<br>21/<br>3/ <sub>4</sub> 43/   | 27/8 13/8<br>27/8 11/8<br>211/16 11/8<br>21/2 1<br>23/8 1<br>21/4 1<br>21/8 15/8   | 306<br>279<br>250<br>229<br>207<br>192                                    | 2.9<br>3.2<br>3.5<br>3.8                                    | -    | 21.5   |                             | 3.63                 | 0.73         | 11900            | 864                   | 11.0  | 1030      | 152             | 3.23     | 154               | 1020           | 238                    |
| 21/16 21<br>17/8 21<br>13/4 21<br>13/4 21<br>13/4 21<br>13/4 21<br>13/16 21<br>15/16 21<br>15/16 21<br>15/16 21<br>31/2 183/4<br>215/16 183/4<br>211/16 183/4<br>21/16 183/4<br>21/16 183/4<br>21/2 183/4<br>11/2 183/4<br>21/3 183/4<br>21/4 183/4<br>21/4 183/4<br>21/4 183/4<br>21/2 183/4<br>21/2 183/4<br>21/2 21<br>23/16 21   | 27/<br>211/<br>21/<br>23/<br>21/<br>21/<br>21/<br>3/4 43/  | 27/8 11/8<br>211/16 11/8<br>21/2 1<br>22/2 1<br>22/8 1<br>21/4 1<br>21/8 15/8  | 279<br>250<br>229<br>207<br>192   | 3.2<br>3.5<br>3.8   | -    |  |                             | 3.60                 | 0.89         | 10700            | 789                   | 10.9  | 919       | 137             | 3.20     | 119               | 922            | 214                    |
| 17/8 21 13/4 21 13/4 21 13/15 21 15/16 21 15/16 21 15/16 21 31/2 183/4 215/16 183/4 215/16 183/4 21/16 183/4 21/16 183/4 21/16 183/4 11/2 183/4 11/2 183/4 11/2 183/4 11/2 183/4 21/6 21 23/6 21 23/6 21 23/6 21 23/6 21 23/6 21   | 211<br>21/<br>23/<br>21/<br>21/<br>21/<br>3/4 43/  | 211/ <sub>16</sub> 11/ <sub>1</sub><br>21/ <sub>2</sub> 1<br>23/ <sub>8</sub> 1<br>21/ <sub>4</sub> 1<br>21/ <sub>8</sub> 15/ <sub>16</sub>  | 250<br>229<br>207<br>192  | 3.5<br>3.8  |      |  |                             | 3.57                 | 0.89         | 9600             | 718                   | 10.9  | 823       | 124             | 3.17     | 91.7              | 835            | 193                    |
| 13/4 21 13/4 21 13/4 21 13/4 21 15/16 21 15/16 21 15/16 13/4 215/16 183/4 215/16 183/4 211/16 183/4 211/16 183/4 21/16 183/4 21/1/16 183/4 21/1/16 183/4 21/1/16 183/4 21/1/16 183/4 21/1/16 183/4 21/1/16 183/4 21/1/16 183/4 21/1/16 183/4 21/1/16 183/4 21/1/16 183/4 21/1/16 183/4 21/1/16 183/4 21/1/16 183/4 21/1/16 21/16 23/16 21 23/16 21 23/16 21 23/16 21 23/16 21 23/16 21   | 21/<br>23/<br>21/<br>21/<br>21/<br>3/ <sub>4</sub> 43/   | 21/ <sub>2</sub> 1<br>23/ <sub>8</sub> 1<br>21/ <sub>4</sub> 1<br>21/ <sub>8</sub> 15/ <sub>18</sub>   | 229<br>207<br>192   | 3.8   | -    | 23.0   | -                           | 3.53                 | 1.06         | 8490             | 644                   | 10.7  | 724       | 110             | 3.14     | 67.3              | 744            | 171                    |
| 19/16 21<br>17/16 21<br>15/16 21<br>15/16 21<br>31/2 183/4<br>215/16 183/4<br>215/16 183/4<br>21/16 183/4<br>21/16 183/4<br>21/16 183/4<br>21/16 183/4<br>11/2 183/4<br>11/2 183/4<br>11/2 183/4<br>11/2 183/4<br>27/8 21<br>27/8 21<br>25/8 21<br>23/8 21  | 23/<br>21/<br>21/<br>21/<br>3/ <sub>4</sub> 43/  | 23/8 1<br>21/4 1<br>21/8 15/6  | 207<br>192  |   |      |  | 1                           |                      |              |                  | 588                   | 10.7  | 651       | 99.4            | 3.11     | 51.8              | 676            | 154                    |
| 17/15 21 18/16 21 18/16 21 31/2 183/4 33/16 183/4 215/16 183/4 211/16 183/4 21/16 183/4 21/4 183/4 21/4 183/4 21/4 183/4 21/2 183/4 11/2 183/4 11/2 183/4 21/6 21 25/6 21 23/6 21 23/6 21 23/6 21 23/6 21  | 21/21/3/4 43/  | 21/4 1 21/8 15/8   | 192   |   | -    | 27.1   |                             | 3.51                 | 1.15         | 7650<br>6820     | 531                   | 10.7  | 578       | 88.8            | 3.08     | 38.6              | 606            | 137                    |
| 15/16 21   | 3/4 43/  | 21/8 15/1  |   | 4.1   | -    | 29.6   |                             |                      |              |                  |                       |       | 530       | 81.8            | 3.00     | 31.0              | 559            | 126                    |
| 31/2 183/4<br>33/15 183/4<br>215/15 183/4<br>217/15 183/4<br>217/15 183/4<br>21/2 183/4<br>21/2 183/4<br>111/15 183/4<br>111/2 183/4<br>31/8 21<br>25/6 21<br>23/6 21<br>23/6 21<br>23/15 21<br>23/15 21   | 3/4 43   |  |   | 4.4   | -    | 31.4   | -                           | 3.46                 | 1.35         | 6260             | 491                   | 10.5  | 479       | 74.3            | 3.04     | 24.1              | 511            | 115                    |
| 33/16 183/4<br>215/16 183/4<br>211/18 183/4<br>27/16 183/4<br>27/16 183/4<br>2 183/4<br>2 183/4<br>111/16 183/4<br>111/16 183/4<br>31/8 21<br>27/8 21<br>25/6 21<br>23/8 21<br>23/16 21<br>23/16 21<br>23/16 21  |  |  | 1/6   | 4.8   | -    | 33.7   | 58.3                        | 3.44                 | 1.46         | 5680             | 450                   | 10.5  | 4/9       | 74.3            | 3.04     | 24.1              | 311            | 113                    |
| 33/16 183/4<br>215/16 183/4<br>211/18 183/4<br>27/16 183/4<br>27/16 183/4<br>2 183/4<br>2 183/4<br>111/16 183/4<br>111/16 183/4<br>31/8 21<br>27/8 21<br>25/6 21<br>23/8 21<br>23/16 21<br>23/16 21<br>23/16 21  |  | 13/4 21/1  | 457   | 1.9   | -    | 14.5   |                             | 3.50                 | 0.62         | 15900            | 1120                  | 10.9  | 1320      | 202             | 3.14     | 431               | 1360           | 321                    |
| 215/16 183/4<br>211/18 183/4<br>27/16 183/4<br>21/16 183/4<br>2 183/4<br>183/4<br>11/19 183/4<br>11/19 183/4<br>11/19 183/4<br>11/2 183/4<br>12/18 21<br>25/6 21<br>23/8 21<br>23/16 21<br>23/16 21<br>23/16 21<br>23/16 21<br>23/16 21<br>23/16 21<br>23/16 21<br>23/16 21  |  | 17/16 2  | 414   | 2.0   | -    | 15.5   | - 0                         | 3.45                 | 0.67         | 14000            | 1010                  | 10.8  | 1160      | 180             | 3.09     | 328               | 1210           | 285                    |
| 211/16 183/4<br>27/16 183/4<br>21/4 183/4<br>2 183/4<br>113/16 183/4<br>111/16 183/4<br>11/2 183/4<br>31/8 21<br>25/8 21<br>23/16 21<br>2 21   |  | 13/16 115/16   | 375   | 2.2   | -    | 16.6   | -                           | 3.41                 | 0.73         | 12400            | 913                   | 10.6  | 1020      | 160             | 3.04     | 248               | 1090           | 253                    |
| 27/16 183/4<br>21/4 183/4<br>2 183/4<br>113/16 183/4<br>111/18 183/4<br>11/2 183/4<br>11/2 183/4<br>27/8 21<br>27/8 21<br>29/8 21<br>29/16 21<br>2 21  |  | 10   | 343   | 2.3   | - 11 | 17.8   | -                           | 3.37                 | 0.78         | 11100            | 833                   | 10.5  | 906       | 144             | 3.01     | 194               | 982            | 227                    |
| 21/4 183/4<br>2 183/4<br>113/16 183/4<br>111/16 183/4<br>111/2 183/4<br>31/8 21<br>27/8 21<br>25/8 21<br>23/16 21<br>2 21  |  | 311/16 111/16  |   | 2.5   | -    | 19.3   |                             | 3.33                 | 0.85         | 9850             | 752                   | 10.4  | 798       | 128             | 2.96     | 146               | 891            | 202                    |
| 2 18 <sup>3</sup> / <sub>4</sub><br>11 <sup>3</sup> / <sub>16</sub> 18 <sup>3</sup> / <sub>4</sub><br>11 <sup>1</sup> / <sub>16</sub> 18 <sup>3</sup> / <sub>4</sub><br>11 <sup>1</sup> / <sub>2</sub> 18 <sup>3</sup> / <sub>4</sub><br>31/ <sub>8</sub> 21<br>2 <sup>7</sup> / <sub>8</sub> 21<br>2 <sup>5</sup> / <sub>8</sub> 21<br>2 <sup>3</sup> / <sub>8</sub> 21<br>2 <sup>3</sup> / <sub>16</sub> 21<br>2 21  |  | 31/2 13/4  | 280   | 2.8   | -    | 20.7   | - 1                         | 3.29                 | 0.94         | 8680             | 675                   | 10.3  | 699       | 113             | 2.92     | 108               | 794            | 178                    |
| 113/16 183/4<br>111/16 183/4<br>11/2 183/4<br>31/8 21<br>27/8 21<br>25/8 21<br>23/8 21<br>23/16 21<br>2 21   |  | 35/16 111/18   |   | 3.0   | -    | 22.6   | -                           | 3.25                 | 1.02         | 7750             | 612                   | 10.2  | 621       | 102             | 2.89     | 82.0              | 715            | 159                    |
| 111/16 183/4<br>11/2 183/4<br>11/2 183/4<br>31/8 21<br>27/8 21<br>25/8 21<br>23/8 21<br>23/16 21<br>2 21   |  | 31/16 15/1   | 228   | 3.3   | - 1  | 24.4   | -                           | 3.22                 | 1.12         | 6850             | 550                   | 10.1  | 546       | 90.1            | 2.85     | 60.6              | 638            | 141                    |
| 11/2 183/4<br>31/8 21<br>27/8 21<br>25/8 21<br>23/8 21<br>23/16 21<br>2 21   |  | 215/16 19/18   | 207   | 3.6   | -    | 26.5   | -                           | 3.19                 | 1.23         | 6140             | 499                   | 10.0  | 486       | 80.8            | 2.82     | 46.1              | 576            | 126                    |
| 31/8 21<br>27/8 21<br>25/8 21<br>23/8 21<br>23/16 21<br>2 21   |  | 23/4 19/16   | 750   | 3.9   | -    | 28.6   | -                           | 3.16                 | 1.34         | 5500             | 453                   | 9.97  | 433       | 72.6            | 2.80     | 35.0              | 519            | 113                    |
| 27/8 21<br>25/8 21<br>23/8 21<br>23/ <sub>16</sub> 21<br>2 21  |  | 215/46 13/4  | 354   | 1.6   | -    | 16.5   |                             | 2.69                 | 0.90         | 12400            | 857                   | 11.0  | 567       | 111             | 2.35     | 242               | 1040           | 181                    |
| 25/8 21<br>23/8 21<br>23/16 21<br>2 21   |  | 0 10   | 319   | 1.7   | -    | 17.8   | -                           | 2.64                 | 0.98         | 10900            | 771                   | 10.8  | 492       | 98.0            | 2.29     | 181               | 938            | 159                    |
| 2 <sup>3</sup> / <sub>8</sub> 21<br>2 <sup>3</sup> / <sub>16</sub> 21<br>2 21  | 0.7  | 0-18   |   | 1.9   | -    | 19.1   | -                           | 2.60                 | 1.06         | 9760             | 701                   | 10.7  | 434       | 87.5            | 2.25     | 140               | 847            | 142                    |
| 2 <sup>3</sup> / <sub>16</sub> 21<br>2 21  |  | 0.110  |   | 2.0   | -    | 20.4   | -                           | 2.57                 | 1.16         | 8650             | 633                   | 10.6  | 381       | 77.7            | 2.22     | 106               | 760            | 125                    |
| 2 21   |  | 0.710  |   | 2.2   | -    | 22.1   |                             | 2.53                 | 1.27         | 7740             | 574                   | 10.5  | 335       | 69.3            | 2.18     | 80.8              | 685            | 111                    |
| -  | 0.4  | 0  |   | 2.4   | -    | 23.7   |                             | 2.50                 | 1.38         | 6920             | 521                   | 10.4  | 296       | 61.9            | 2.15     | 61.6              | 618            | 99.                    |
|  | 0.0  | 2.0110   |   | 2.6   | -    | 25.7   | 0 2 0                       | 2.47                 | 1.50         | 6230             | 475                   | 10.3  | 264       | 55.7            | 2.13     | 47.5              | 560            | 89.                    |
| 17/8 21  |  | 2-10   | 181   | 2.8   | -    | 27.6   | 100                         | 2.45                 | 1.64         | 5600             | 432                   | 10.3  | 235       | 50.0            | 2.10     | 36.4              | 507            | 79.                    |
| 111/16 21  | 0.0  | 6.15   | 163   | 3.0   | -    | 30.2   | 0-0                         | 2.42                 | 1.79         | 5000             | 390                   | 10.2  | 207       | 44.6            | 2.08     | 27.3              | 455            | 70                     |
| 19/16 21   |  | 2-110  |   | 3.3   | -    | 32.9   | 61.1                        | 2.39                 | 1.99         | 4410             | 348                   | 10.1  | 181       | 39.3            | 2.05     | 19.8              | 405            | 62.                    |
| 13/8 21  |  | 20/16  | "   | 3.7   | -    | 37.3   | 47.4                        | 2.37                 | 2.25         | 3810             | 305                   | 10.1  | 155       | 33.9            | 2.03     | 13.5              | 352            | 53.                    |
| 11/4 21  |  | 4 71   |   | 4.1   | -    | 40.6   | 40.1                        | 2.35                 | 2.49         | 3400             | 275                   | 10.0  | 137       | 30.2            | 2.01     | 9.96              | 316            | 47.                    |
| 11/8 21  |  | 1//8   |   | 4.6   | -    | 44.6   | 33.2                        | 2.33                 | 2.78         | 3000             | 245                   | 9.96  | 119       | 26.5            | 1.99     | 7.11              | 280            | 41.                    |
| 1 21   | 1 12   | 13/4   | 1   |   |      |  |                             |                      |              |                  |                       |       |           |                 |          |                   |                |                        |
|  |  |  |   |   |      |  |                             |                      |              |                  |                       |       |           |                 |          |                   |                |                        |



# TAILOR-MADE WIDE FLANGE BEAMS Dimensions

Compact Se Criteria

Ksi

6 1.9 - 19.6 6 2.1 - 20.8 4 2.3 - 22.4 8 2.4 - 23.5 1 2.6 - 25.5 6 2.9 - 28.0 3 3.1 - 30.7 8 3.5 - 33.5

6 2.0 - 14. 7 2.2 - 15. 6 2.4 - 16. 6 2.6 - 18. 9 2.8 - 19. 5 3.0 - 20. 3 3.3 - 22. 4 3.6 - 24.

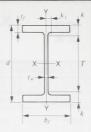
15.0 16.0 17.1 18.6 19.8 21.6 23.4 25.3 2.9 -3.2 -3.9 -42 -27.4 4.6 -30.0 14.7 2.4 15.6 2.6 -16.8 28 -18.2 3.0 -19.5 3.3 - 3.6 -21.2 22.5 3.9 -24.3 4.2 - 4.6 -26.7 28.7

|                       |         | Area         | De    | pth               |       | Web                                  |                 |                | Flar                                 | nge    |                                       |   | Distanc  | е              |
|-----------------------|---------|--------------|-------|-------------------|-------|--------------------------------------|-----------------|----------------|--------------------------------------|--------|---------------------------------------|---|--|----------------|
| Designat              | ion     | A            |       | d                 | Thick |                                      | $\frac{t_w}{2}$ | Widt<br>bs     |                                      | Thickr |                                       | T   | k  | k <sub>1</sub> |
|                       |         | In.2         | In.   | In.               | In.   | In.                                  | In.             | ln.            | In.                                  | In.    | In.                                   | In.   | In.  | In.            |
| WTM 22X 12            | X395    | 115.0        | 25.67 | 255/ <sub>8</sub> | 1.750 | 13/4                                 | 7/8             | 12.870         | 127/8                                | 3.150  | 31/8                                  | 17  | 45/16  | 2              |
|                       | 357     | 104.0        | 25.12 | 251/8             | 1.590 | 19/16                                | 13/16           | 12.715         | 123/4                                | 2.870  | 27/8                                  | 17  | 41/16  | 115/           |
|                       | 326     | 95.6         | 24.65 | 245/8             | 1.460 | 17/16                                | 3/4             | 12.575         | 125/8                                | 2.640  | 25/8                                  | 17  | 313/16   |                |
|                       | 295     | 86.7         | 24.17 | 241/8             | 1.340 | 15/16                                | 11/16           | 12.460         | 121/2                                | 2.400  | 23/8                                  | 17  | 39/16  | 113/           |
|                       | 269     | 78.9         | 23.78 | 233/4             | 1.220 | 11/4                                 | 5/8             | 12.340         | 123/8                                | 2.200  | 23/16                                 | 17  | 33/8   | 13/4           |
|                       | 245     | 71.9         | 23.39 | 233/8             | 1.120 | 11/8                                 | 9/16            | 12.245         | 121/4                                | 2.010  | 2                                     | 17  | 33/16  | 111/           |
|                       | 223     | 65.7         | 23.07 | 231/8             | 1.020 | 1                                    | 1/2             | 12.145         | 121/8                                | 1.850  | 17/8                                  | 17  | 31/16  | 15/8           |
|                       | 204     | 60.0         | 22.76 | 223/4             | 0.940 | 1                                    | 1/2             | 12.065         | 121/8                                | 1.690  | 111/16                                |   | 27/8   | 15/8           |
| WTM 22X8.5            | X236    | 69.4         | 24.98 | 25                | 1.300 | 15/16                                | 11/16           | 9.030          | 9                                    | 2.340  | 25/16                                 | 181/8   | 37/16  | 111/           |
|                       | 216     | 63.5         | 24.59 | 245/8             | 1.200 | 13/16                                | 5/8             | 8.930          | 87/8                                 | 2.150  | 21/8                                  | 18 <sup>1</sup> / <sub>8</sub>                                | 31/4   | 15/8           |
|                       | 194     | 57.1         | 24.20 | 241/4             | 1.080 | 11/16                                | 9/16            | 8.815          | 87/8                                 | 1.950  | 2 / 8                                 | 181/8   | 31/16  | 19/1           |
|                       | 178     | 52.3         | 23.88 | 237/8             | 1.000 | 1                                    | 1/2             | 8.735          | 83/4                                 | 1.790  | 113/16                                |   | 27/8   |                |
|                       | 161     | 47.4         | 23.57 | 235/8             | 0.910 |                                      | -               | 8.635          | 85/8                                 | 1.630  |                                       |   |  | 11/2           |
|                       | 146     | 42.9         | 23.25 | 231/4             | 0.830 | 15/16                                |                 | 8.555          | -                                    |        | 15/8                                  | 181/8   | 23/4   | 17/-           |
|                       | 133     | 39.1         | 23.02 | 23                | 0.830 | 13/16                                |                 |                | 81/2                                 | 1.480  | 11/2                                  | 181/8   | 29/16  | 17/-           |
|                       | 118     | 34.5         | 22.70 | 223/4             | 0.730 | 3/ <sub>4</sub><br>11/ <sub>16</sub> | 3/8<br>3/8      | 8.480<br>8.400 | 81/ <sub>2</sub><br>83/ <sub>8</sub> | 1.360  | 13/ <sub>8</sub><br>13/ <sub>16</sub> | 18 <sup>1</sup> / <sub>8</sub> 18 <sup>1</sup> / <sub>8</sub> | 2 <sup>7</sup> / <sub>16</sub><br>2 <sup>5</sup> / <sub>16</sub> | 13/1           |
| WTM 21X 12.2          | 5 V 400 | 118.0        | 26.02 | 26                | 1.730 | 12/                                  | 7/              | 10.405         | 102/                                 | 0.400  | 01/                                   | 101/  | 07/  | 471            |
| W 1 W 1 Z 1 A 1 Z . Z | 364     | 107.0        | 25.47 | 251/2             |       | 13/4                                 | 7/8             | 13.405         | 133/8                                | 3.130  | 31/8                                  | 181/4   | 37/8   | 17/            |
|                       | 333     | 97.9         | 25.00 | 25 / 2            | 1.590 | 19/16                                | 13/16           | 13.265         | 131/4                                | 2.850  | 27/8                                  | 181/4   | 35/8   | 13/            |
|                       | 300     | 88.2         | 24.53 |                   | 1.460 | 17/16                                | 3/4             | 13.130         | 131/8                                | 2.620  | 25/8                                  | 181/4   | 33/8   | 15/            |
|                       | 275     | 80.8         | 24.53 | 241/2             | 1.320 | 15/16                                | 11/16           | 12.990         | 13                                   | 2.380  | 23/8                                  | 181/4   | 31/8   | 11/            |
|                       | 248     | 72.8         |       | 241/8             | 1.220 | 11/4                                 | 5/8             | 12.890         | 127/8                                | 2.190  | 23/16                                 | 181/4   | 3  | 13/            |
|                       | 223     |              | 23.74 | 233/4             | 1.100 | 11/8                                 | 9/16            | 12.775         | 123/4                                | 1.990  | 2                                     | 181/4   | 23/4   | 11/            |
|                       | 201     | 65.4<br>59.2 | 23.35 | 233/8             | 1.000 | 1                                    | 1/2             | 12.675         | 125/8                                | 1.790  | 113/16                                |   | 29/16  | 11/            |
|                       |         |              | 23.03 | 23                | 0.910 | 15/16                                |                 | 12.575         | 125/8                                | 1.630  | 15/8                                  | 181/4   | 23/8   | 1              |
|                       | 182     | 53.6         | 22.72 | 223/4             | 0.830 | 13/16                                |                 | 12.500         | 121/2                                | 1.480  | 11/2                                  | 181/4   | 21/4   | 1              |
|                       | 166     | 48.8         | 22.48 | 221/2             | 0.750 | 3/4                                  | 3/8             | 12.420         | 123/8                                | 1.360  | 13/8                                  | 181/4   | 21/8   | 15             |
| WTM 18X11             | X311    | 91.5         | 22.32 | 223/8             | 1.520 | 11/2                                 | 3/4             | 12.005         | 12                                   | 2.740  | 23/4                                  | 151/2   | 37/16  | 13/            |
|                       | 283     | 83.2         | 21.85 | 217/8             | 1.400 | 13/8                                 | 11/16           | 11.890         | 117/8                                | 2.500  | 21/2                                  | 151/2   | 33/16  | 13/            |
|                       | 258     | 75.9         | 21.46 | 211/2             | 1.280 | 11/4                                 | 5/8             | 11.770         | 113/4                                | 2.300  | 25/16                                 | 151/2   | 3  | 11/            |
|                       | 234     | 68.8         | 21.06 | 21                | 1.160 | 13/16                                | 5/8             | 11.650         | 115/8                                | 2.110  | 21/8                                  | 151/2   | 23/4   | 1              |
|                       | 211     | 62.1         | 20.67 | 205/8             | 1.060 | 11/16                                | 9/16            | 11.555         | 111/2                                | 1.910  | 115/16                                | 151/2   | 29/16  | 1              |
|                       | 192     | 56.4         | 20.35 | 203/8             | 0.960 | 1                                    | 1/2             | 11.455         | 111/2                                | 1.750  | 13/4                                  | 151/2   | 27/16  | 15             |
|                       | 175     | 51.3         | 20.04 | 20                | 0.890 | 7/8                                  | 7/16            | 11.375         | 113/8                                | 1.590  | 19/16                                 | 151/2   | 21/4   | 7/             |
|                       | 158     | 46.3         | 19.72 | 193/4             | 0.810 | 13/16                                | 7/16            | 11.300         | 111/4                                | 1.440  | 17/16                                 | 151/2   | 21/8   | 7,             |
|                       | 143     | 42.1         | 19.49 | 191/2             | 0.730 | 3/4                                  | 3/8             | 11.220         | 111/4                                | 1.320  | 15/16                                 | 151/2   | 2  | 12             |
|                       | 130     | 38.2         | 19.25 | 191/4             | 0.670 | 11/16                                | 3/8             | 11.160         | 111/8                                | 1.200  | 13/16                                 | 151/2   | 17/8   | 10             |
|                       |         |              |       |                   |       |                                      |                 |                |                                      |        |                                       |   |  |                |



### BEAMS

# TAILOR-MADE WIDE FLANGE BEAMS Properties



|        |                | Distanc    | 8      | lom-<br>inal | Co                        |             | t Secti<br>teria | on         |      |                 |       | E        | lastic-Pr | opertie | S        |      | Tor-<br>sional- |       | astic<br>dulus |
|--------|----------------|------------|--------|--------------|---------------------------|-------------|------------------|------------|------|-----------------|-------|----------|-----------|---------|----------|------|-----------------|-------|----------------|
| ness   | T              |            | H      | Wt.          | 6,                        | $F_{y}^{'}$ | d                | $F_y^{"'}$ | rT   | $\frac{d}{A_f}$ | 1     | Axis X-X |           |         | Axis Y-Y |      | con             | $Z_x$ | $Z_{\nu}$      |
|        | T              | k          | h      | Ft.          | $\frac{\partial f}{2t_f}$ | 1 у         | $\frac{a}{t_w}$  | 1 у        |      | Aj              | I     | S        | r         | I       | 5        | r    | J               |       | -y             |
| In.    | ln.            | ln.        | h      | Lb.          |                           | Ksi         |                  | Ksi        | In.  |                 | In.4  | In.3     | In.       | In.4    | In.3     | In.  | In.4            | In.3  | In.3           |
| 31/8   | 17             | ASI        |        | 395          | 2.0                       |             | 14.7             |            | 3.47 | 0.63            | 11500 | 895      | 10.00     | 1130    | 175      | 3.13 | 306             | 1070  | 277            |
| 27/8   | 17             | 45/16      |        | 357          | 2.2                       | -           | 15.8             | _          | 3.42 | 0.69            | 10100 | 807      | 9.87      | 991     | 156      | 3.09 | 230             | 961   | 245            |
| 25/8   |                | 10         | 115 8  | 326          | 2.4                       | -           | 16.9             | 10 - T     | 3.38 | 0.74            | 9050  | 734      | 9.73      | 881     | 140      | 3.03 | 179             | 877   | 220            |
|        | 17             | 313/16     |        | 295          | 2.6                       | -           | 18.0             |            | 3.34 | 0.81            | 8010  | 663      | 9.61      | 778     | 125      | 3.00 | 135             | 786   | 196            |
| 23/8   | 17             | - 10       |        | 269          | 2.8                       | -           | 19.5             | _          | 3.31 | 0.88            | 7170  | 603      | 9.53      | 693     | 112      | 2.96 | 104             | 710   | 176            |
| 23/16  | 17             | 33/8       | 19/4   | 245          | 3.0                       |             | 20.9             |            | 3.28 | 0.95            | 6410  | 548      | 9.44      | 618     | 101      | 2.93 | 79.3            | 640   | 158            |
| 2      | 17             | 33/16      | 111/8  | 223          | 3.3                       |             | 22.6             |            | 3.25 | 1.03            | 5780  | 501      | 9.38      | 555     | 91.3     | 2.91 | 61.5            | 582   | 142            |
| 17/8   | 17             | 31/16 27/8 | 15/1   | 204          | 3.6                       |             | 24.2             | -          | 3.22 | 1.12            | 5190  | 456      | 9.31      | 497     | 82.3     | 2.88 | 47.3            | 527   | 128            |
| 25/16  | 181/8          | 37/16      | 1115-4 | 236          | 1.9                       | -           | 19.2             | -          | 2.36 | 1.18            | 6420  | 514      | 9.61      | 291     | 64.6     | 2.05 | 94.8            | 620   | 105            |
| 21/8   | 181/8          |            | 15/2   | 216          | 2.1                       | -           | 20.5             | -          | 2.33 | 1.28            | 5760  | 468      | 9.52      | 259     | 57.9     | 2.02 | 73.8            | 562   | 93.            |
| 2 2    | 181/8          |            | 19/4   | 194          | 2.3                       | -           | 22.4             | -          | 2.30 | 1.41            | 5090  | 421      | 9.45      | 225     | 51.1     | 1.99 | 54.7            | 501   | 82.            |
|        |                |            | 41/    | 178          | 2.4                       | -           | 23.9             | -          | 2.27 | 1.53            | 4600  | 385      | 9.37      | 201     | 46.0     | 1.96 | 42.7            | 456   | 73.            |
| 113/16 |                |            | 17/42  | 161          | 2.6                       | -           | 25.9             | -          | 2.24 | 1.67            | 4100  | 348      | 9.31      | 177     | 40.9     | 1.93 | 32.3            | 410   | 65             |
| 15/8   | 181/8          |            | 17/15  | 146          | 2.9                       | -           | 28.0             | -          | 2.21 | 1.84            | 3660  | 315      | 9.23      | 156     | 36.4     | 1.90 | 24.3            | 369   | 58             |
| 11/2   | 181/8          |            |        | 133          | 3.1                       | -           | 30.7             | -          | 2.19 | 2.00            | 3310  | 287      | 9.20      | 139     | 32.8     | 1.89 | 18.7            | 335   | 52             |
| 13/8   | 181/8<br>181/8 |            | 13/8   | 118          | 3.5                       | -           | 33.9             | 57.5       | 2.16 | 2.25            | 2870  | 253      | 9.13      | 119     | 28.4     | 1.86 | 13.1            | 293   | 45             |
|        | 181/4          | 37/8       | 17/10  | 402          | 2.1                       | -           | 15.0             | -          | 3.63 | 0.62            | 12200 | 937      | 10.2      | 1270    | 189      | 3.27 | 297             | 1130  | 296            |
| 31/8   | 181/4          |            | 13/1   | 364          | 2.3                       | -           | 16.0             | -          | 3.59 | 0.67            | 10800 | 846      | 10.0      | 1120    | 168      | 3.23 | 225             | 1010  | 263            |
| 27/8   |                |            | 15/14  | 333          | 2.5                       | -           | 17.1             | -          | 3.55 | 0.73            | 9610  | 769      | 9.91      | 994     | 151      | 3.19 | 174             | 915   | 237            |
| 25/8   | 181/4          |            | 11/4   | 300          | 2.7                       | -           | 18.6             | -          | 3.51 | 0.79            | 8480  | 692      | 9.81      | 873     | 134      | 3.15 | 130             | 816   | 210            |
| 23/8   | 181/4          |            | 13/16  | 275          | 2.9                       | -           | 19.8             | -          | 3.48 | 0.85            | 7620  | 632      | 9.71      | 785     | 122      | 3.12 | 101             | 741   | 189            |
| 23/16  | 181/4          | 3          | 11/6   | 248          | 3.2                       | -           | 21.6             | -          | 3.45 | 0.93            | 6760  | 569      | 9.63      | 694     | 109      | 3.09 | 75.2            | 663   | 169            |
| 2      | 181/4          |            | 41/    | 223          | 3.5                       | -           | 23.4             | -          | 3.41 | 1.03            | 5950  | 510      | 9.54      | 609     | 96.1     | 3.05 | 54.9            | 589   | 149            |
| 113/16 |                |            | 1/170  | 201          | 3.9                       | -           | 25.3             | -          | 3.38 | 1.12            | 5310  | 461      | 9.47      | 542     | 86.1     | 3.02 | 41.3            | 530   | 133            |
| 15/8   | 181/4          |            | 4      | 182          | 4.2                       | -           | 27.4             | -          | 3.36 | 1.23            | 4730  | 417      | 9.40      | 483     | 77.2     | 3.00 | 31.0            | 476   | 119            |
| 11/2   | 181/4          |            | 15/16  | 166          | 4.6                       | -           | 30.0             | -          | 3.34 | 1.33            | 4280  | 380      | 9.36      | 435     | 70.1     | 2.98 | 23.8            | 432   | 108            |
| 1-78   |                |            | 13/16  | 311          | 2.2                       | -           | 14.7             | -          | 3.26 | 0.68            | 6960  | 624      | 8.72      | 795     | 132      | 2.95 | 177             | 753   | 207            |
| 23/4   | 151/2          | -01        | 13/16  | 283          | 2.4                       | - 11        | 15.6             | -          | 3.23 | 0.74            | 6160  | 564      | 8.61      | 704     | 118      | 2.91 | 135             | 676   | 185            |
| 21/2   | 151/2          |            | 11/8   | 258          | 2.6                       | -           | 16.8             | -          | 3.19 | 0.79            | 5510  | 514      | 8.53      | 628     | 107      | 2.88 | 104             | 611   | 166            |
| 25/16  | 151/2          |            | 11/8   | 234          | 2.8                       | -           | 18.2             | -          | 3.16 | 0.86            | 4900  | 466      | 8.44      | 558     | 95.8     | 2.85 | 79.7            | 549   | 149            |
| 21/8   | 151/2          |            | 4      | 211          | 3.0                       | -           | 19.5             | -          | 3.13 | 0.94            | 4330  | 419      | 8.35      | 493     | 85.3     | 2.82 | 59.3            | 490   | 132            |
| 115/18 | 151/2          |            | 15/4   | 192          | 3.3                       | -           | 21.2             | -          | 3.10 | 1.02            | 3870  | 380      | 8.28      | 440     | 76.8     | 2.79 | 45.2            | 442   | 119            |
| 13/4   | 151/2          |            | 1/8    | 175          | 3.6                       | -           | 22.5             | -          | 3.07 | 1.11            | 3450  | 344      | 8.20      | 391     | 68.8     | 2.76 | 34.2            | 398   | 106            |
| 19/16  | 151/2          |            | 1/8    | 158          | 3.9                       | -           | 24.3             | -          | 3.05 | 1.21            | 3060  | 310      | 8.12      | 347     | 61.4     | 2.74 | 25.4            | 356   | 94             |
| 17/16  | 151/2          |            | 13/11  | 143          | 4.2                       | -           | 26.7             | -          | 3.03 | 1.32            | 2750  | 282      | 8.09      | 311     | 55.5     | 2.72 | 19.4            | 322   | 85             |
| 15/16  | 151/2          | 2          | 13/11  |              | 4.6                       | - 18        | 28.7             | -          | 3.01 | 1.44            | 2460  | 256      | 8.03      | 278     | 49.9     | 2.70 | 14.6            | 290   | 76             |

Sx

#### ALLOWABLE STRESS DESIGN SELECTION TABLE For shapes used as beams

Mi

Kip-Ft.

400 32.7

393 39.0

392 26.5

390 39.3 390

379 41.7 27.7

> 363 358

> 358

356

356 36.4

340

334

306

304

303

342 371 47.8

25.8 368

30.0 364

47.4

35.8

56.2 353

23.9

38.2 343

50.9 341

31.6

23.6

43.9 334 41.3 334

28.2 324

43.5

33.4

32.7

21.8 321

35.2 46.8

28.6

25.4 305

 $F_{\rm w} = 50 \, \text{ksi}$  $F_{\nu} = 36 \text{ ksi}$  $F_{y} = 50 \text{ ksi}$ Depth d  $M_R$ Shape  $L_{u}$  $M_R$  $L_{u}$ Ft. Ksi Ft Kip-ft Ft. Ft. Kip-ft In.3 15.1 19.1 89.6 6350 421/2 3170 WTM 36 × 16.5 × 848 16.2 64.5 8730 85.1 5970 42 19.0 WTM 36 × 16.5 × 798 61.3 8210 2980 16.1 77.9 5370 14.3 WTM 36 × 16.5 × 720 411/4 18.8 15.9 56.1 7380 2690 435/8 63.4 5180 17.8 2590 WTM 40 x 16  $\times 655$ 15.1 45.6 7120 401/2 18.6 71.2 4830 WTM 36 × 16.5 × 650 6640 2420 15.7 51.2 4690 WTM 40 x 16 × 593 43 17.6 58.1 14.9 41.8 6440 2340 65.3 4370 16.0 WTM 36 × 16.5 × 588 397/R 18.4 47.0 6010 2180 15.6 72.0 4350 381/2 17.8 51.9 5980 WTM 33 × 15.75 × 619 15.1 52.5 4190 WTM 40 x 16 × 531 423/R 17.4 2090 14.8 37.8 5760 435/g 13.6 48 6 4150 2080 WTM 40 × 12 × 561 35.0 66.9 3980 5470 1990 WTM 33 × 15.75 × 567 377/8 17.7 48.2 15.0 391/4 18 2 59.2 3910 WTM 36 × 16.5 × 527 15.4 42.6 5370 1950 41 14.0 52.8 3860 WTM 36 × 12  $\times 548$ 38.0 1930 11.8 14.2 431/8 13.5 45.4 3850 WTM 40 x 12 × 520 32.7 5290 1920 11.5 47.8 3780 17.3 5200 1890 WTM 40 x 16 × 480 413/4 14.7 34.4 75.0 3730 17.1 54.0 5130 1870 WTM 30 × 15  $\times581$ 353/8 14.5 17.5 WTM  $33 \times 15.75 \times 515$ 373/8 61.5 3610 14.9 44.3 4960 1810 WTM 36 × 16.5 × 485 383/4 18.1 54.8 3580 39.4 4930 1790 13.8 49.4 3570 35.6 4910 1790 WTM 36 × 12  $\times 508$ 405/8 3510 13.4 41.7 11.3 30.0 4820 1750 WTM 40 x 12 × 475 425/8 × 436 413/8 17.1 43.6 3430 4710 WTM 40 × 16 14.5 31.4 1710 54.5 3420 WTM 33 × 11.5 × 520 381/2 13.5 39.3 4710 4630 1680 WTM 30 × 15 × 526 343/4 16.9 68.9 3370 49.6 14.3 17.4 56.3 3270 40.5 4490 WTM 33 × 15.75 × 468 363/4 147 3250 13.7 45.3 11.6 32.6 4470 1630 WTM 36 × 12  $\times 464$ 40 17.9 50.1 3240 381/4 15.2 36.1 4460 1620 WTM 36 × 16.5 × 439 11.2 27.7 4420 1610 WTM 40 x 12 × 437 421/8 13.2 38.5 3220 3170 4360 WTM 32 × 12 ×511 36 13.7 59.2 42.6 1580 3140 55.4 4320 WTM 27 × 14  $\times 539$ 321/2 16.1 76.9 50.5 3130 WTM 33 × 11.5 × 476 377/8 13.3 36.3 4300 1560 17.0 40.1 3130 14.4 28.9 4300 1560 WTM 40 x 16 × 397 41 142 14.2 45.6 4190 WTM 30 × 15 341/4 16.7 63.3 3050 1530 × 477 × 426 42.0 2980 30.2 4100 1490 WTM 36 × 12 391/2 13.5 51.5 2960 4070 1480 WTM 33 × 15.75 × 424 363/B 17.2 11.1 25.4 4010 1460 415/8 13.1 35.2 2920 WTM 40 x 12 × 396



### ABLE

## ALLOWABLE STRESS DESIGN SELECTION TABLE For shapes used as beams

Sx

|      | $F_y = 36 \text{ ks}$ |              | 100    |                       |         |      |   |       |                |       |                       |         |
|------|-----------------------|--------------|--------|-----------------------|---------|------|---|-------|----------------|-------|-----------------------|---------|
| L    | y - 30 KS             |              |        | $F_y = 50 \text{ ks}$ | si      | Sx   | -Maply                                  | Depth | $F_{y}$        |       | $F_y = 36 \text{ ks}$ | si      |
| Ft   |                       | MR           | $L_c$  | $L_u$                 | $M_R$   | X    | Shape                                   | d     | <sup>1</sup> y | $L_c$ | $L_u$                 | $M_R$   |
|      | Ft.                   | Kip-ft       | Ft.    | Ft.                   | Kip-ft. | In.3 | -                                       | In.   | Ksi            | Ft.   | Ft.                   | Kip-ft. |
| 19.1 | 89.6                  | 6350         | 15.1   | 32.7                  | 4000    | 1450 | WTM 36 × 16.5 × 393                     | 373/4 | _              | 17.8  | 45.3                  | 2910    |
| 19.0 | 85.1                  |              | 13.5   | 51.5                  | 3950    | 1440 | WTM 27 × 14 × 494                       | 32    | -              | 15.9  | 71.5                  | 2870    |
|      | 00.1                  | 5970         | 11.5   | 39.0                  | 3930    | 1430 | WTM 32 × 12 × 462                       | 353/8 | 0-             | 13.5  | 54.2                  | 2860    |
| 18.8 | 77.9                  | 5370         | 14.3   | 26.5                  | 3920    | 1420 | WTM 40 × 16 × 362                       | 401/2 | _              | 16.9  | 36.8                  | 2850    |
| 17.8 | 63.4                  |              | 10.6   | 39.3                  | 3900    | 1420 | WTM 30 × 10.5 × 475                     | 353/8 | -              | 12.5  | 54.6                  | 2830    |
| 17.0 | 03.4                  | 5180         | , 11.2 | 33.3                  | 3900    | 1420 | WTM 33 × 11.5 × 432                     | 373/8 | -              | 13.2  | 46.2                  | 2830    |
| 18.6 | 71.2                  |              | 14.1   | 41.7                  | 3790    | 1380 | WTM 30 × 15 × 433                       | 335/8 | -              | 16.6  | 58.0                  | 2750    |
| 10.0 | 11.2                  | 4830         | 11.3   | 27.7                  | 3720    | 1350 | WTM 36 × 12 × 387                       | 391/8 | -              | 13.4  | 38.4                  | 2710    |
| 17.6 | 58.1                  | 4000         | 14.5   | 34.2                  | 3720    | 1350 | WTM 33 × 15.75 × 387                    | 36    | 0-1            | 17.1  | 47.6                  | 2710    |
| 17.0 | 30,1                  | 4690         | 11.7   | 47.8                  | 3710    | 1350 | WTM 28 × 12 × 485                       | 321/8 | 0-1            | 13.7  | 66.4                  | 2690    |
| 18.4 | 65.3                  | 4370         | 16.0   | 25.8                  | 3680    | 1340 | W 40 × 18 × 328                         | 40    | _              | 18.9  | 35.9                  | 2680    |
| 17.8 | 72.0                  | 4350         | 15.0   | 30.0                  | 3640    | 1320 | WTM 36 × 16.5 × 359                     | 373/8 | _              | 17.7  | 41.6                  | 2650    |
|      |                       |              | 11.0   | 23.0                  | 3630    | 1320 | WTM 40 × 12 × 359                       | 411/8 |                | 12.9  | 32.0                  | 2640    |
| 17.4 | 52.5                  | 4190         | 11.1   | 30.8                  | 3580    | 1300 | WTM 33 × 11.5 × 398                     | 367/8 | _              | 13.1  | 42.8                  | 2600    |
| 13.6 | 48.6                  | 4150         | 13.4   | 47.4                  | 3580    | 1300 | WTM 27 × 14 × 448                       | 313/8 | -              | 15.8  | 65.8                  | 2600    |
| 17.7 | 66.9                  | 3980         | 11.3   | 35.8                  | 3560    | 1290 | WTM 32 × 12 × 418                       | 343/4 | -              | 13.4  | 49.7                  | 2590    |
|      |                       |              | 10.4   | 36.4                  | 3560    | 1290 | WTM 30 × 10.5 × 435                     | 347/8 | -              | 12.3  | 50.6                  | 2590    |
| 18.2 | 59.2<br>52.8          | 3910<br>3860 | 12.6   | 56.2                  | 3530    | 1290 | WTM 24 × 12.75 × 492                    | 295/8 | -              | 14.9  | 78.0                  | 2570    |
|      |                       |              | 14.2   | 23.9                  | 3510    | 1280 | WTM 40 × 16 × 324                       | 401/8 | _              | 16.8  | 33.2                  | 2550    |
| 13.5 | 45.4                  | 3850         | 14.0   | 38.2                  | 3430    | 1250 | WTM 30 × 15 × 391                       | 331/4 | _              | 16.5  | 53.1                  | 2490    |
|      |                       |              | 11.7   | 50.9                  | 3410    | 1240 | WTM 26 × 12 × 473                       | 301/4 | _              | 13.8  | 70.7                  | 2480    |
| 17.3 | 47.8                  | 3780         | 14.4   | 31.6                  | 3400    | 1230 | WTM 33 × 15.75 × 354                    | 351/2 | _              | 17.0  | 43.8                  | 2470    |
| 17.1 | 75.0                  | 3730         | 11.2   | 25.1                  | 3360    | 1220 | WTM 36 × 12 × 350                       | 385/8 | _              | 13.2  | 34.9                  | 2440    |
| 17.5 | 61.5                  | 3610         | 1988   |                       |         |      | 100000000000000000000000000000000000000 | SOUTH |                | 198   |                       |         |
| 18.1 | 54.8                  | 3580         | 16.0   | 23.6                  | 3350    | 1220 | W 40 × 18 × 298                         | 393/4 | _              | 18.8  | 32.8                  | 2430    |
| 13.8 | 49.4                  | 3570         | 11.5   | 43.9                  | 3340    | 1210 | WTM 28 × 12 × 438                       | 311/2 | -              | 13.5  | 60.9                  | 2430    |
|      |                       |              | 10.2   | 41.3                  | 3340    | 1210 | WTM 27 × 10 × 446                       | 321/2 | _              | 12.0  | 57.3                  | 2430    |
| 13.4 | 41.7                  | 3510         | 14.9   | 27.6                  | 3340    | 1210 | WTM 36 × 16.5 × 328                     | 371/8 | _              | 17.6  | 38.4                  | 2430    |
|      |                       |              | 10.9   | 21.1                  | 3310    | 1200 | WTM 40 × 12 × 327                       | 403/4 | _              | 12.8  | 29.4                  | 2410    |
| 17.1 | 43.6                  | 3430         | 11.0   | 28.2                  | 3240    | 1180 | WTM 33 × 11.5 × 361                     | 363/8 | -              | 12.9  | 39.2                  | 2360    |
| 13.5 | 54.5                  | 3420         | 13.3   | 43.5                  | 3230    | 1170 | WTM 27 × 14 × 407                       | 307/8 | -              | 15.6  | 60.4                  | 2350    |
| 16.9 | 68.9                  | 3370         | 10.3   | 33.4                  | 3220    | 1170 | WTM 30 × 10.5 × 394                     | 341/4 | _              | 12.1  | 46.4                  | 2340    |
| 17.4 | 56.3                  | 3270         | 11.2   | 32.7                  | 3210    | 1170 | WTM 32 × 12 × 380                       | 341/4 | -              | 13.2  | 45.4                  | 2340    |
| 13.7 | 45.3                  | 3250         | -      |                       |         |      |   |       |                |       |                       |         |
|      |                       |              | 14.2   | 21.8                  | 3210    | 1170 | WTM 40 × 16 × 297                       | 397/8 | -              | 16.7  | 30.3                  | 2330    |
| 17.9 | 50.1                  | 3240         | 13.9   | 35.2                  | 3120    | 1140 | WTM 30 × 15 × 357                       | 323/4 | -              | 16.3  | 48.9                  | 2270    |
|      |                       |              | 11.5   | 46.8                  | 3070    | 1120 | WTM 26 × 12 × 427                       | 295/8 | -              | 13.6  | 65.0                  | 2230    |
| 13.2 | 38.5                  | 3220         | 11.1   | 23.1                  | 3060    | 1110 | WTM 36 × 12 × 318                       | 381/4 | -              | 13.1  | 32.1                  | 2220    |
| 13.7 | 59.2                  | 3170         | 14.3   | 28.6                  | 3050    | 1110 | WTM 33 × 15.75 × 318                    | 351/8 | _              | 16.9  | 39.8                  | 2220    |
| 16.1 | 76.9                  | 3140         | 14.9   | 25.4                  | 3050    | 1110 | W 36×16.5 ×300                          | 363/4 | _              | 17.6  | 35.3                  | 2220    |
| 13.3 | 50.5                  | 3130         | 10.0   | 38.2                  | 3040    | 1110 | WTM 27 × 10 × 407                       | 32    | _              | 11.8  | 53.1                  | 2210    |
| 17.0 | 40.1                  | 3130         | 14.2   | 20.9                  | 3030    | 1100 | W 40 × 16 × 277                         | 393/4 | -              | 16.7  | 29.1                  | 2200    |
| 16.7 | 63.3                  | 3050         | 11.4   | 40.3                  | 3020    | 1100 | WTM 28 × 12 × 397                       | 31    | -              | 13.4  | 55.9                  | 2200    |
| 13.5 | 42.0                  | 2980         |        |                       |         |      |   |       |                |       |                       |         |
| 17.2 | 51.5                  | 2960         |        |                       |         |      |   |       |                |       |                       |         |
| 17.2 |                       | 2920         |        |                       |         |      |   |       |                |       |                       |         |
| 13.1 | 35.2                  | 2320         |        |                       |         |      | ATTE BENTSH                             | SWA   |                |       |                       |         |
|      |                       |              |        |                       |         |      | 1000 000 D X                            |       |                |       |                       |         |
|      |                       | _            |        |                       |         |      |   |       |                |       |                       |         |

 $S_{x}$ 

### ALLOWABLE STRESS DESIGN SELECTION TABLE

For shapes used as beams

 $F_v = 50 \text{ ksi}$ 

14.1 14.5 19.8 33.3 24.0 28.6 29.1 26.6 21.8 15.0 20.9 34.7

12.8

12.3 30.7 26.4 26.6 20.0 13.9 21.4 24.4 16.5

11.4 24.8 28.4 13.1 24.3 32.7 15.2 18.3

19.4 22.1 29.1 12.2 26.3 26.1 35.7 22.3 29.7 13.8 35.1 16.6 

|                            | $F_y = 50 \text{ ks}$      | si      | Sx   |                      | Depth  | F <sub>y</sub> |       | $F_y = 36  \text{k}$ | csi    |
|----------------------------|----------------------------|---------|------|----------------------|--------|----------------|-------|----------------------|--------|
| $L_{\varepsilon}$          | $L_{\scriptscriptstyle H}$ | $M_R$   |      | Shape                | d      | - 3'           | $L_c$ | $L_{\mu}$            | $M_R$  |
| Ft.                        | Ft.                        | Kip-ft. | In.3 |                      | In.    | Ksi            | Ft.   | Ft.                  | Kip-ft |
| 15.9                       | 21.3                       | 3010    | 1090 | W 40×18 ×268         | 393/8  | -              | 18.7  | 29.5                 | 2190   |
| 10.8                       | 19.2                       | 2980    | 1080 | WTM 40 × 12 × 294    | 403/8  | -              | 12.7  | 26.6                 | 2170   |
| 10.9                       | 26.0                       | 2970    | 1080 | WTM 33 × 11.5 × 332  | 36     | -              | 12.8  | 36.2                 | 2160   |
| 13.1                       | 39.9                       | 2920    | 1060 | WTM 27 × 14 × 368    | 303/8  | -              | 15.5  | 55.4                 | 2120   |
| 10.2                       | 30.5                       | 2910    | 1060 | WTM 30 × 10.5 × 358  | 333/4  | -              | 12.0  | 42.3                 | 2110   |
| 11.1                       | 29.8                       | 2900    | 1060 | WTM 32 × 12 × 343    | 333/4  | -              | 13.1  | 41.4                 | 2110   |
| 13.8                       | 32.4                       | 2850    | 1030 | WTM 30 × 15 × 326    | 323/8  | _              | 16.2  | 45.0                 | 2070   |
| 14.9                       | 23.8                       | 2840    | 1030 | W 36×16.5 ×280       | 361/2  | -              | 17.5  | 33.0                 | 2070   |
| 14.2                       | 26.3                       | 2790    | 1010 | WTM 33 × 15.75 × 291 | 347/8  | -              | 16.8  | 36.6                 | 2030   |
| 11.4                       | 43.0                       | 2770    | 1010 | WTM 26 × 12 × 387    | 29     | -              | 13.4  | 59.8                 | 2020   |
| 11.0                       | 20.9                       | 2750    | 1000 | WTM 36 × 12 × 286    | 377/8  | _              | 13.0  | 29.1                 | 2000   |
| 9.9                        | 35.1                       | 2750    | 1000 | WTM 27 × 10 × 369    | 313/8  | -              | 11.7  | 48.7                 | 2000   |
| 14.1                       | 18,9                       | 2730    | 992  | W 40×16 ×249         | 393/8  | _              | 16.6  | 26.3                 | 1980   |
| 11.2                       | 36.9                       | 2720    | 990  | WTM 28 × 12 × 360    | 303/8  | _              | 13.2  | 51.2                 | 1980   |
| 10.8                       | 23.9                       | 2700    | 983  | WTM 33 × 11.5 × 302  | 355/8  | -              | 12.7  | 33.3                 | 1970   |
| 15.9                       | 19.0                       | 2700    | 983  | W 40×18 ×244         | 20     |                |       |                      |        |
| 10.7                       | 17.2                       |         |      |                      | 39     | -              | 18.7  | 26.4                 | 1970   |
|                            | 36.8                       | 2670    | 971  | WTM 40 × 12 × 264    | 40     | -              | 12.6  | 23.9                 | 1940   |
|                            |                            | 2670    | 970  | WTM 27 × 14 × 336    | 30     | -              | 15.4  | 51.2                 | 1940   |
| 11.0                       | 27.4                       | 2650    | 963  | WTM 32 × 12 × 313    | 333/8  | -              | 12.9  | 38.1                 | 1930   |
| 10.0                       | 27.8                       | 2630    | 955  | WTM 30 × 10.5 × 323  | 331/4  | -              | 11.8  | 38.7                 | 1910   |
| 14.8                       | 21.9                       | 2620    | 953  | W 36 × 16.5 × 260    | 361/4  | -              | 17.5  | 30.4                 | 1910   |
| 13.7                       | 29.4                       | 2550    | 928  | WTM 30 × 15 × 292    | 32     | -              | 16.1  | 40.8                 | 1860   |
| 14.2                       | 24.0                       | 2520    | 917  | WTM 33 × 15.75 × 263 | 341/2  | -              | 16.7  | 33.3                 | 1830   |
| 11.3                       | 39.4                       | 2500    | 909  | WTM 26 × 12 × 351    | 281/2  | -              | 13.3  | 54.7                 | 1820   |
| 9.8                        | 32.1                       | 2480    | 902  | WTM 27 × 10 × 335    | 307/8  | -              | 11.5  | 44.5                 | 1800   |
| 10.9                       | 18.8                       | 2460    | 895  | WTM 36 × 12 × 256    | 373/8  |                | 12.9  | 26.1                 | 1790   |
| 14.8                       | 20.6                       | 2460    | 895  | W 36×16.5 ×245       | 361/8  | -              | 17.4  | 28.6                 | 1790   |
| 11.1                       | 33.7                       | 2460    | 894  | WTM 28 × 12 × 325    | 297/B  | -              | 13.1  | 46.8                 | 179    |
| 10.7                       | 21.7                       | 2430    | 884  | WTM 33 × 11.5 × 271  | 351/4  | -              | 12.6  | 30.2                 | 1771   |
| 12.9                       | 34.0                       | 2430    | 884  | WTM 27 × 14 × 307    | 295/8  | -              | 15.2  | 47.2                 | 1771   |
| 10.9                       | 25.2                       | 2410    | 878  | WTM 32 × 12 × 286    | 33     | -              | 12.8  | 35.0                 | 176    |
| 10.6                       | 15.7                       | 2400    | 874  | W 40 × 12 × 235      | 391/4  | _              | 12.6  | 21.8                 | 175    |
| 9.9                        | 25.6                       | 2390    | 871  | WTM 30 × 10.5 × 295  | 327/8  |                | 11.7  | 35.6                 | 174    |
| 12.1                       | 40.6                       | 2380    | 864  | WTM 24 × 12.75 × 335 | 271/2  | _              | 14.3  | 56.4                 | 173    |
| 15.9                       | 16.3                       | 2360    | 858  | W 40×18 ×221         | 385//8 | 61.1           | 18.7  | 22.6                 | 172    |
|                            |                            |         |      |                      | - 1    | 01.1           | 10.7  | 22.0                 | 1/2    |
| 14.1                       | 16.4                       | 2360    | 858  | W 40×16 ×215         | 39     | -              | 16.6  | 22.8                 | 172    |
|                            | 19.3                       | 2300    | 837  | W 36×16.5 ×230       | 357/8  | -              | 17.4  | 26.8                 | 167    |
| 14.2                       | 21.7                       | 2280    | 829  | W 33 × 15.75 × 241   | 341/8  |                | 16.7  | 30.1                 | 166    |
| 11.1                       | 26.4                       | 2270    | 827  | WTM 30 × 15 × 261    | 315/8  | -              | 16.0  | 36.6                 | 165    |
|                            | 36.1                       | 2260    | 821  | WTM 26 × 12 × 317    | 28     | -              | 13.1  | 50.1                 | 164    |
|                            |                            | 2240    | 815  | WTM 28 × 12 × 296    | 291/2  | -              | 13.0  | 43.1                 | 163    |
| 12.9                       | 29.3                       | 2240    | 815  | WTM 27 × 10 × 302    | 305/8  | -              | 11.4  | 40.7                 | 163    |
| 10.9                       | 31.5                       | 2230    | 811  | WTM 27 × 14 × 281    | 291/4  | -              | 15.1  | 43.8                 | 162    |
| 9.8                        | 17.1                       | 2220    | 809  | WTM 36 × 12 × 232    | 371/8  | -              | 12.8  | 23.7                 | 162    |
| 10.6                       | 23.6                       | 2180    | 793  | WTM 30 × 10.5 × 269  | 321/2  | -              | 11.6  | 32.7                 | 159    |
|                            | 19.5                       | 2180    | 791  | WTM 33 × 11.5 × 243  | 347/8  |                | 12.5  | 27.1                 | 158    |
| 12.0                       | 37.6                       | 2170    | 789  | WTM 24 × 12.75 × 306 | 271/8  | -              | 14.1  | 52.2                 | 158    |
| TATE OF THE REAL PROPERTY. | 22.8                       | 2170    | 788  | WTM 32 × 12 × 256    | 325/8  | _              | 12.7  | 31.6                 | 158    |



### TABLE

## ALLOWABLE STRESS DESIGN SELECTION TABLE For shapes used as beams

Sx

|      |                       |        | 1              |                       |              |            |   |  |         |              |                      |              |
|------|-----------------------|--------|----------------|-----------------------|--------------|------------|---|--|---------|--------------|----------------------|--------------|
|      | $F_y = 36 \text{ ks}$ | si     |                | $F_y = 50 \text{ ks}$ | si           | -          | Angeld Lawrence                             | Depth  | F '     |              | $F_y = 36 \text{ k}$ | si           |
| Lc   | $L_u$                 | MR     | L <sub>c</sub> | Lu                    | $M_R$        | $S_x$      | Shape                                       | d  | $F_{y}$ | $L_c$        | $L_u$                | $M_R$        |
| Ft.  | Ft.                   | Kip-tt | Ft.            | Ft.                   | Kip-ft.      | ln.3       |   | In.  | Ksi     | Ft.          | Ft.                  | Kip-ft.      |
| 18.7 | 29.5                  | 2190   | 100            | 14.1                  | 2160         | 785        | W 40×12 ×211                                | 393/8  |         | 40.5         | 40.7                 | 4570         |
| 12.7 | 26.6                  | 2170   | 10.6           | 14.1                  | 2100         | /65        | W 40 × 12 × 211                             | 393/8  |         | 12.5         | 19.7                 | 1570         |
| 12.8 | 36.2<br>55.4          | 2160   | 14.1           | 14.5                  | 2120         | 769        | W 40 × 16 × 199                             | 385/8  | -       | 16.6         | 20.1                 | 1540         |
| 12.0 | 42.3                  | 2120   | 14.2           | 19.8                  | 2080         | 757        | W 33 × 15.75 × 221                          | 337/8  | -       | 16.7         | 27.5                 | 1510         |
| 13.1 | 41.4                  | 2110   | 11.0           | 33.3                  | 2060         | 748        | WTM 26 × 12 × 289                           | 275/8  | -       | 13.0         | 46.2                 | 1500         |
| 16.2 | 45.0                  | 2110   | 13.5           | 24.0                  | 2050         | 746        | WTM 30 × 15 × 235                           | 311/4  | _       | 15.9         | 33.4                 | 1490         |
| 17.5 | 33.0                  | 2070   | 10.9           | 28.6                  | 2040<br>2040 | 742<br>742 | WTM 28 × 12 × 270<br>WTM 27 × 14 × 258      | 29 <sup>1</sup> / <sub>8</sub><br>29                             | _       | 12.9         | 39.7<br>40.4         | 1480         |
| 16.8 | 36.6                  | 2030   | 12.8           | 29.1<br>26.6          | 2000         | 729        | WTM 27 × 14 × 256                           | 297/8  |         | 15.1<br>11.2 | 36.9                 | 1480<br>1460 |
| 13.4 | 59.8                  | 2020   | 9.5            | 21.8                  | 2000         | 727        | WTM 30 × 10.5 × 246                         | 321/8  |         | 11.5         | 30.2                 | 1450         |
| 13.0 | 29.1                  | 2000   | 10.9           | 15.0                  | 1980         | 719        | W 36×12 ×210                                | 363/4  |         | 12.9         | 20.9                 | 1440         |
| 11.7 | 48.7                  | 2000   | 10.7           | 20.9                  | 1980         | 719        | WTM 32 × 12 × 234                           | 321/4  | _       | 12.6         | 29.0                 | 1440         |
|      |                       | 2000   | 11.9           | 34.7                  | 1970         | 718        | WTM 24 × 12.75 × 279                        | 263/4  | _       | 14.0         | 48.2                 | 1440         |
| 16.6 | 26.3                  | 1980   | 10.5           | 17.7                  | 1960         | 714        | WTM 33 × 11.5 × 219                         | 341/2  | _       | 12.3         | 24.6                 | 1430         |
| 13.2 | 51.2                  | 1980   |                |                       |              |            |   |  |         |              |                      |              |
| 12.7 | 33.3                  | 1970   | 12.8           | 12.8                  | 1890         | 708        | W 40 × 18 × 192                             | 381/4  | 37.1    | 17.8         | 19.7                 | 1410         |
|      |                       |        | 14.1           | 17.9                  | 1880         | 684        | W 33 × 15.75 × 201                          | 335/8  | _       | 16.6         | 24.9                 | 1370         |
| 18.7 | 26.4                  | 1970   |                |                       | 1 88         | 100        |   |  |         |              |                      |              |
| 12.6 | 23.9                  | 1940   | 10.6           | 12.3                  | 1870         | 682        | W 40 × 12 × 183                             | 39   | -       | 12.5         | 17.1                 | 1360         |
| 15.4 | 51.2                  | 1940   | 10.9           | 30.7                  | 1870         | 680        | WTM 26 × 12 × 264                           | 271/4  | -       | 12.9         | 42.6                 | 1360         |
| 12.9 | 38.1                  | 1930   | 10.8           | 26.4                  | 1870         | 680        | WTM 28 × 12 × 247                           | 287/8  | -       | 12.8         | 36.7                 | 1360         |
| 11.8 | 38.7                  | 1910   | 12.7           | 26.6                  | 1850         | 674        | WTM 27 × 14 × 235                           | 285/8  | -       | 15.0         | 36.9                 | 1350         |
| 17.5 | 30.4                  | 1910   | 9.7            | 20.0                  | 1830         | 665        | WTM 30 × 10.5 × 226                         | 317/8  | -       | 11.4         | 27.8                 | 1330         |
| 16.1 | 40.8                  | 1860   | 10.9           | 13.9                  | 1830         | 664        | W 36×12 ×194                                | 361/2  | _       | 12.8         | 19.4                 | 1330         |
| 16.7 | 33.3                  | 1830   | 13.5           | 21.4                  | 1820         | 663        | W 30×15 ×211                                | 31   | -       | 15.9         | 29.7                 | 1330         |
| 13.3 | 54.7                  | 1820   | 9.4            | 24.4                  | 1820         | 662        | WTM 27 × 10 × 247                           | 291/2  |         | 11.1         | 33.9                 | 1320<br>1320 |
| 11.5 | 44.5                  | 1800   | 10.4           | 16.5<br>31.5          | 1820<br>1770 | 662<br>644 | WTM 33 × 11.5 × 204<br>WTM 24 × 12.75 × 250 | 341/ <sub>4</sub><br>263/ <sub>8</sub>                           |         | 13.9         | 43.8                 | 1290         |
| 12.9 | 26.1                  | 1790   | 11.0           | 31.5                  | 1770         | 044        | W11V1 24 X 12.75 X 250                      | 200/8  | _       | 15.5         | 45.0                 | 1290         |
| 17.4 | 28.6                  | 1790   | 11.4           | 11.4                  | 1740         | 636        | W 40×16 ×174                                | 381/4  | 46.9    | 15.8         | 17.4                 | 1270         |
| 13.1 | 46.8                  | 1770   | 12.6           | 24.8                  | 1720         | 624        | WTM 27 × 14 × 217                           | 283/8  | -       | 14.9         | 34.5                 | 1250         |
| 12.6 | 47.2                  | 1770   | 10.9           | 28.4                  | 1720         | 624        | WTM 26 × 12 × 241                           | 267/8  | _       | 12.8         | 39.4                 | 1250         |
| 15.2 | 35.0                  | 1760   | 10.8           | 13.1                  | 1710         | 623        | W 36×12 ×182                                | 363/8  | _       | 12.7         | 18.2                 | 1250         |
| 12.8 | 35.0                  |        | 10.8           | 24.3                  | 1710         | 621        | WTM 28 × 12 × 226                           | 281/2  | _       | 12.7         | 33.7                 | 1240         |
| 12.6 | 21.8                  | 1750   | 10.9           | 32.7                  | 1680         | 612        | WTM 24 × 12 × 253                           | 253/8  | _       | 12.9         | 45.4                 | 1220         |
| 12.6 | 35.6                  | 1740   | 10.4           | 15.2                  | 1670         | 607        | WTM 33 × 11.5 × 187                         | 34   | -       | 12.2         | 21.1                 | 1210         |
| 14.3 | 56.4                  | 1730   | 9.6            | 18.3                  | 1660         | 605        | WTM 30 × 10.5 × 207                         | 311/2  | -       | 11.3         | 25.4                 | 1210         |
| 113  | 000                   | 1720   | 10.5           | 10.5                  | 1650         | 599        | W 40 × 12 × 167                             | 385/8  | _       | 12.5         | 14.5                 | 1200         |
| 18.7 | 22.6                  | 1150   | 13.5           | 19.4                  | 1640         | 598        | W 30×15 ×191                                | 305/8  | _       | 15.9         | 26.9                 | 1200         |
|      | 22.8                  | 1720   | 9.3            | 22.1                  | 1630         | 593        | WTM 27 × 10 × 221                           | 291/8  | -       | 11.0         | 30.7                 | 1190         |
| 16.6 | 26.8                  | 1670   | 11.7           | 29.1                  | 1620         | 588        | WTM 24 × 12.75 × 229                        | 26   | -       | 13.8         | 40.4                 | 1180         |
| 17.4 | 30.1                  | 1660   | 10.8           | 12.2                  | 1600         | 580        | W 36×12 ×170                                | 361/8  | _       | 12.7         | 16.9                 | 1160         |
| 16.7 | 36.6                  | 1650   | 8.7            | 26.3                  | 1580         | 574        | WTM 24 × 9 × 239                            | 27   | -       | 10.2         | 36.5                 | 1150         |
| 16.0 | 50.1                  | 1640   | 10.8           | 26.1                  | 1570         | 569        | WTM 26 × 12 × 221                           | 265/8  | -       | 12.7         | 36.3                 | 1140         |
| 13.1 | 43.1                  | 1630   | 11.4           | 35.7                  | 1570         | 569        | WTM 21 × 12.25 × 248                        | 233/4  | -       | 13.5         | 49.6                 | 1140         |
| 13.0 | 40.7                  | 1630   | 12.6           | 22.3                  | 1530         | 556        | WTM 27 × 14 × 194                           | 281/8  | -       | 14.8         | 31.0                 | 1110         |
| 11.4 | 43.8                  | 1620   | 10.9           | 29.7                  | 1510         | 550        | WTM 24 × 12 × 228                           | 247/8  | -       | 12.8         | 41.2<br>19.2         | 1100<br>1100 |
| 15.1 | 23.7                  | 1620   | 11.0           | 13.8<br>35.1          | 1510         | 549        | WTM 33 × 11.5 × 169<br>WTM 22 × 12 × 245    | 33 <sup>7</sup> / <sub>8</sub><br>23 <sup>3</sup> / <sub>8</sub> |         | 12.1         | 48.7                 | 1100         |
| 11.6 | 32.7                  | 1590   | 9.5            | 16.6                  | 1510<br>1490 | 548<br>543 | WTM 22 × 12 × 245<br>WTM 30 × 10.5 × 185    | 311/4  |         | 11.2         | 23.0                 | 1090         |
| 12.5 | 27.1                  | 1580   | 0.0            | 10.0                  | 1490         | 545        | W 11VI 30 X 10.5 X 105                      | 31.74  |         | 11.2         | 20.0                 | 1000         |
| 14.1 | 52.2                  | 1580   |                |                       |              |            |   |  |         |              |                      |              |
| 12.7 | 31.6                  | 1000   |                |                       |              |            |   |  |         |              |                      |              |
| 14.  |                       | _      |                |                       |              |            |   |  |         |              |                      |              |
|      |                       |        |                |                       |              |            |   |  |         |              |                      |              |



 $S_{x}$ 

## ALLOWABLE STRESS DESIGN SELECTION TABLE For shapes used as beams

 $F_v = 50 \text{ ksi}$ 

9.9 16.8 18.2 27.5 14.8 8.9 11.4 19.7 14.9 16.7 25.3 13.4 18.3

14.8

9.2

10.9 8.0 18.7

8.5 20.2 29.2

26.7 18.0 7.4 9.6 13.7 24.5

| $L_{c}$ |           |         | Sx   |   |       |     |         |            |        |
|---------|-----------|---------|------|---|-------|-----|---------|------------|--------|
|         | $L_{\mu}$ | $M_R$   |      | Shape                                     | d     | Fy  | $L_{c}$ | Lu         | $M_R$  |
| Ft.     | Ft.       | Kip-ft. | in.3 |   | In.   | Ksi | Ft.     | Ft.        | Kip-ft |
| 10.7    | 11.3      | 1490    | 542  | W 36×12 ×160                              | 36    | _   | 12.7    | 15.7       | 1080   |
| 9.3     | 20.2      | 1480    | 540  | WTM 27 × 10 × 201                         | 287/8 | _   | 10.9    | 28.1       | 1080   |
| 13.4    | 17.5      | 1480    | 539  | W 30×15 ×173                              | 301/2 | _   | 15.8    | 24.3       | 1080   |
| 11.7    | 26.5      | 1460    | 531  | WTM 24 × 12.75 × 207                      | 253/4 | _   | 13.7    | 36.8       | 1060   |
| 8.6     | 24.1      | 1430    | 521  | WTM 24 × 9 × 218                          | 265/8 | -   | 10.1    | 33.5       | 1040   |
| 8.1     | 28.2      | 1410    | 514  | WTM 22 × 8.5 × 236                        | 25    | -   | 9.5     | 39.2       | 1030   |
| 8.6     | 8.6       | 1410    | 512  | W 40×12 ×149                              | 381/4 | _   | 11.9    | 12.6       | 1020   |
| 11.4    | 32.4      | 1400    | 510  | WTM 21 × 12.25 × 223                      | 233/8 | _   | 13.4    | 45.0       | 1020   |
| 10.5    | 10.5      | 1390    | 504  | W 36 x 12 x 150                           | 357/8 |     | 12.6    | 14.5       | 1010   |
|         |           |         | 502  | W 27 × 14 × 178                           | 273/4 |     |         |            | 1000   |
| 12.6    | 20.1      | 1380    |      | WTM 24 × 12 × 207                         | 245/8 |     | 14.9    | 27.9       | 998    |
| 10.8    | 27.2      | 1370    | 499  |   |       |     | 12.7    | 37.8       |        |
| 11.6    | 24.7      | 1350    | 491  | WTM 24 × 12.75 × 192<br>WTM 27 × 10 × 182 | 251/2 | -   | 13.7    | 34.4       | 982    |
| 9.2     | 18.5      | 1340    | 488  |   | 281/2 | -   | 10.8    | 25.6       | 975    |
| 10.4    | 12.1      | 1340    | 487  | W 33 × 11.5 × 152                         | 331/2 | -   | 12.2    | 16.9       | 974    |
| 9.5     | 14.8      | 1330    | 483  | WTM 30 × 10.5 × 165                       | 307/8 | -   | 11.1    | 20.6       | 966    |
| 8.5     | 22.2      | 1310    | 475  | WTM 24 × 9 × 198                          | 261/4 | -   | 10.0    | 30.9       | 949    |
| 8.0     | 26.0      | 1290    | 468  | WTM 22 × 8.5 × 216                        | 245/8 | -   | 9.4     | 36.1       | 936    |
| 11.3    | 29.7      | 1270    | 461  | WTM 21 × 12.25 × 201                      | 23    | -   | 13.3    | 41.2       | 922    |
| 10.8    | 29.9      | 1250    | 456  | WTM 22 × 12 × 204                         | 223/4 | -   | 12.7    | 41.5       | 912    |
| 12.6    | 18.3      | 1250    | 455  | W 27×14 ×161                              | 275/8 | -   | 14.8    | 25.4       | 910    |
| 10.7    | 24.9      | 1240    | 453  | WTM 24 × 12 × 188                         | 241/4 |     | 12.6    | 34.6       | 905    |
| 11.5    | 22.8      | 1240    | 450  | WTM 24 × 12.75 × 176                      | 251/4 |     | 13.6    | 31.7       | 900    |
| 10.3    | 11.1      | 1230    | 448  | W 33×11.5 ×141                            | 331/4 | -   | 12.2    | 15.4       | 895    |
|         |           |         |      |   |       |     | 1000    |            |        |
| 8.9     | 8.9       | 1210    | 439  | W 36×12 ×135                              | 351/2 | -   | 12.3    | 13.0       | 877    |
| 9.4     | 13.4      | 1200    | 436  | WTM 30 × 10.5 × 148                       | 305/8 | -   | 11.1    | 18.7       | 87     |
| 8.4     | 20.4      | 1190    | 432  | WTM 24 × 9 × 181                          | 26    |     | 9.9     | 28.3       | 863    |
| 9.1     | 16.1      | 1160    | 424  | WTM 27 × 10 × 159                         | 281/8 |     | 10.7    | 22.4       | 847    |
| 7.9     | 23.7      | 1160    | 421  | WTM 22 × 8.5 × 194                        | 241/4 |     | 9.3     | 32.9       | 842    |
| 11.2    | 27.1      | 1150    | 417  | WTM 21 × 12.25 × 182                      | 228/4 |     | 13.2    | 37.7       | 833    |
| 11.6    | 21.1      | 1140    | 414  | W 24 × 12.75 × 162                        | 25    |     | 13.7    | 29.3       | 827    |
| 12.5    | 16.6      | 1130    | 411  | W 27×14 ×146                              | 270/8 |     | 14.7    | 23.0       | 823    |
|         |           |         |      |   |       |     |         | 1 11 10 11 |        |
| 9.9     | 9.9       | 1120    | 406  | W 33×11.5 ×130                            | 331/8 | -   | 12.1    | 13.8       | 811    |
| 8.3     | 18.6      | 1070    | 390  | WTM 24 × 9 × 163                          | 255/8 | -   | 9.8     | 25.8       | 771    |
| 7.8     | 21.8      | 1060    | 385  | WTM 22 × 8.5 × 178                        | 237/8 |     | 9.2     | 30.3       | 761    |
| 9.0     | 14.7      | 1050    | 383  | WTM 27 × 10 × 143                         | 277/8 | -   | 10.6    | 20.4       | 76     |
| 11.1    | 25.0      | 1050    | 380  | WTM 21 × 12.25 × 166                      | 221/2 |     | 13.1    | 34.8       | 76     |
| 9.4     | 11.6      | 1050    | 380  | W 30×10.5 ×132                            | 301/4 |     | 11.1    | 16.1       | 76     |
| 10.3    | 32.8      | 1050    | 380  | WTM 18 × 11 × 192                         | 203/8 | -   | 12.1    | 45.6       | 76     |
| 11.6    | 18.9      | 1020    | 371  | W 24 × 12.75 × 146                        | 240/4 |     | 13.6    | 26.3       | 74     |
| 8.6     | 8.6       | 987     | 359  | W 33×11.5 ×118                            | 327/8 | -   | 12.0    | 12.6       | 71     |
| 9.4     | 10.8      | 976     | 355  | W 30×10.5 ×124                            | 301/8 | -   | 11.1    | 15.0       | 71     |
| 8.3     | 16.7      | 958     | 348  | WTM 24 × 9 × 146                          | 250/8 | -   | 9.7     | 23.3       | 69     |
| 7.7     | 19.9      | 957     | 348  | WTM 22 × 8.5 × 161                        | 235/8 |     | 9.1     | 27.6       | 69     |
| 9.0     | 13.3      | 947     | 345  | WTM 27 × 10 × 129                         | 275/8 |     | 10.6    | 18.4       | 68     |
| 10.2    | 30.1      | 947     | 344  | WTM 18 × 11 × 175                         | 20    | _   | 12.0    | 41.8       | 68     |
| 11.2    | 21.7      | 905     | 329  | W 21 × 12.25 × 147                        | 22    | -   | 13.2    | 30.2       | 65     |
|         |           |         |      |   |       |     |         |            |        |



### TABLE

## ALLOWABLE STRESS DESIGN SELECTION TABLE For shapes used as beams

Sx

| L    | $F_y = 36 \text{ kg}$ | Si      |                | $F_y = 50 \text{ ks}$ | il          | $S_x$          | -0400              | Depth      | $F_{\nu}$ | $F_y = 36 \text{ ksi}$ |           |         |
|------|-----------------------|---------|----------------|-----------------------|-------------|----------------|--------------------|------------|-----------|------------------------|-----------|---------|
| Ft.  | Lu                    | MR      | L <sub>c</sub> | $L_u$                 | $M_R$       | o <sub>x</sub> | Shape              | d          | 1 y       | $L_c$                  | $L_{\mu}$ | $M_R$   |
| 16   | Ft.                   | Kip-ft. | Ft.            | Ft.                   | Kip-ft.     | In.3           |                    | In.        | Ksi       | Ft.                    | Ft.       | Kip-ft. |
| 12.7 | 15.7                  | 1080    | 9.4            | 9.9                   | 904         | 329            | W 30×10.5 ×116     | 30         |           | 11.1                   | 13.8      | 657     |
| 10.9 | 28.1                  | 1080    | 11.5           | 16.8                  | 903         | 329            | W 24 × 12.75 × 131 | 241/2      |           | 13.6                   | 23.3      | 657     |
| 15.8 | 24.3                  | 1080    | 7.7            | 18.2                  | 865         | 315            | WTM 22 × 8.5 × 146 | 231/4      |           | 9.0                    | 25.2      | 629     |
| 13.7 | 36.8                  | 1060    | 10.1           | 27.5                  | 852         | 310            | WTM 18 × 11 × 158  | 193/4      |           | 11.9                   | 38.2      | 619     |
| 10.1 | 33.5                  | 1040    | 8.2            | 14.8                  | 839         | 305            | WTM 24 × 9 × 128   | 25         |           | 9.6                    | 20.6      | 610     |
| 9.5  | 39.2                  | 1030    |                |                       |             |                |                    |            |           |                        |           |         |
| 110  |                       |         | 8.9            | 8.9                   | 823         | 299            | W 30 × 10.5 × 108  | 297/8      | -         | 11.1                   | 12.4      | 598     |
| 11.9 | 12.6                  | 1020    | 9.0            | 11.4                  | 823         | 299            | W 27×10 ×114       | 271/4      | -         | 10.6                   | 15.9      | 598     |
|      | 45.0                  | 1020    | 11.1           | 19.7                  | 812         | 295            | W 21 × 12.25 × 132 | 217/8      | -         | 13.1                   | 27.3      | 590     |
| 12.6 | 14.5                  | 1010    | 11.5           | 14.9                  | 801         | 291            | W 24 × 12.75 × 117 | 241/4      | -         | 13.5                   | 20.8      | 582     |
| 14.9 | 27.9                  | 1000    | 7.6            | 16.7                  | 790         | 287            | WTM 22 × 8.5 × 133 | 23         | _         | 9.0                    | 23.2      | 574     |
| 12.7 | 37.8                  | 998     | 10.0           | 25.3                  | 775         | 282            | WTM 18 × 11 × 143  | 191/2      | -         | 11.8                   | 35.2      | 564     |
| 13.7 | 34.4                  | 982     | 8.1            | 13.4                  | 755         | 275            | WTM 24 × 9 × 115   | 243/4      | -         | 9.6                    | 18.6      | 549     |
| 10.8 | 25.6                  | 975     | 11.1           | 18.3                  | 751         | 273            | W 21 × 12.25 × 122 | 215/8      | -         | 13.1                   | 25.4      | 546     |
| 12.2 | 16.9                  | 974     |                |                       | 1 1 1 1 1 1 | 1 200          |                    |            |           |                        |           |         |
| 11.1 | 20.6                  | 966     | 7.9            | 7.9                   | 741         | 269            | W 30 × 10.5 × 99   | 295/8      | -         | 10.9                   | 11.4      | 538     |
| 10.0 | 30.9                  | 949     | 9.0            | 10.2                  | 735         | 267            | W 27 × 10 × 102    | 271/8      | _         | 10.6                   | 14.2      | 534     |
| 9.4  | 36.1                  | 936     | 11.4           | 13.2                  | 709         | 258            | W 24 × 12.75 × 104 | 24         | 58.5      | 13.5                   | 18.4      | 516     |
| 13.3 | 41.2                  | 922     | 10.0           | 23.2                  | 703         | 256            | WTM 18 × 11 × 130  | 191/4      | _         | 11.8                   | 32.2      | 511     |
| 12.7 | 41.5                  | 912     | 7.5            | 14.8                  | 696         | 253            | WTM 22 × 8.5 × 118 | 223/4      | _         | 8.9                    | 20.6      | 506     |
| 14.8 | 25.4                  | 910     | 11.1           | 16.7                  | 683         | 249            | W 21 × 12.25 × 111 | 211/2      | _         | 13.0                   | 23.2      | 497     |
| 12.6 | 34.6                  | 906     | 8.1            | 12.0                  | 672         | 245            | WTM 24 × 9 × 103   | 241/2      | _         | 9.5                    | 16.6      | 489     |
| 13.6 | 31.7                  | 900     |                |                       |             |                |                    |            |           |                        |           |         |
|      |                       |         | 8.9            | 9.2                   | 668         | 243            | W 27 × 10 × 94     | 267/8      | -         | 10.5                   | 12.8      | 485     |
| 12.2 | 15.4                  | 895     | 10.1           | 21.0                  | 634         | 231            | W 18×11 ×119       | 19         | _         | 11.9                   | 29.1      | 461     |
|      |                       |         | 11.0           | 15.3                  | 623         | 227            | W 21 × 12.25 × 101 | 213/8      | _         | 13.0                   | 21.3      | 453     |
| 12.3 | 13.0                  | 877     | 8.1            | 10.9                  | 610         | 222            | W 24 × 9 × 94      | 241/4      | _         | 9.6                    | 15.1      | 444     |
| 11.1 | 18.7                  | 871     |                |                       |             |                |                    |            |           |                        |           |         |
| 9.9  | 28.3                  | 863     | 8.0            | 8.0                   | 586         | 213            | W 27 × 10 × 84     | 263/4      | -         | 10.5                   | 11.1      | 426     |
| 10.7 | 22.4                  | 847     | 10.0           | 18.7                  | 561         | 204            | W 18×11 ×106       | 183/4      | -         | 11.8                   | 26.0      | 408     |
| 9.3  | 32.9                  | 842     |                |                       |             |                |                    |            |           |                        |           |         |
| 13.2 | 37.7                  | 833     | 8.1            | 9.6                   | 540         | 196            | W 24 × 9 × 84      | 241/8      | -         | 9.5                    | 13.3      | 392     |
| 13.7 | 29.3                  | 827     | 7.5            | 12.1                  | 526         | 192            | W 21 × 8.25 × 93   | 215/8      | -         | 8.9                    | 16.8      | 383     |
| 13.7 | 23.0                  | 822     | 13.1           | 31.7                  | 522         | 190            | W 14 × 14.5 × 120  | 141/2      | -         | 15.5                   | 44.1      | 380     |
| 14./ | 20.0                  |         | 10.0           | 17.4                  | 516         | 188            | W 18×11 × 97       | 185/8      | -         | 11.8                   | 24.1      | 375     |
| 12.1 | 13.8                  | 811     |                |                       | 100         | 1              |                    |            |           |                        |           |         |
| 9.8  | 25.8                  | 779     | 8.1            | 8.5                   | 482         | 176            | W 24 × 9 × 76      | 237/8      | -         | 9.5                    | 11.8      | 351     |
| 9.2  | 30.3                  | 769     | 9.3            | 20.2                  | 481         | 175            | W 16 × 10.25 × 100 | 17         | -         | 11.0                   | 28.0      | 350     |
| 10.6 | 20.4                  | 765     | 13.1           | 29.2                  | 475         | 173            | W 14 × 14.5 × 109  | 143/8      | 58.6      | 15.4                   | 40.6      | 345     |
| 13.1 | 34.8                  | 760     | 7.5            | 10.9                  | 470         | 171            | W 21 × 8.25 × 83   | 213/8      | -         | 8.8                    | 15.1      | 341     |
|      | 16.1                  | 760     | 9.9            | 15.5                  | 456         | 166            | W 18×11 × 86       | 183/8      | -         | 11.7                   | 21.5      | 332     |
| 11.1 | 45.6                  | 760     | 13.0           | 26.7                  | 430         | 157            | W 14×14.5 × 99     | 141/8      | 48.5      | 15.4                   | 37.1      | 313     |
| 12.1 | 26.3                  | 741     | 9.3            | 18.0                  | 426         | 155            | W 16 × 10.25 × 89  | 163/4      | -         | 10.9                   | 25.1      | 310     |
| 13.6 | 20.0                  | 100     |                |                       |             |                |                    |            |           |                        | 40.0      |         |
| 400  | 12.6                  | 718     |                | 7.4                   | 423         | 154            | W 24 × 9 × 68      | 233/4      | -         | 9.5                    | 10.2      | 308     |
| 12.0 | 15.0                  | 710     | 7.4            | 9.6                   | 415         | 151            | W 21 × 8.25 × 73   | 211/4      | -         | 8.8                    | 13.4      | 301     |
| 11.1 | 23.3                  | 696     | 9.9            | 13.7                  | 402         | 146            | W 18×11 × 76       | 181/4      | 64.2      | 11.6                   | 19.1      | 292     |
| 9.7  | 27.6                  | 696     | 13.0           | 24.5                  | 383         | 143            | W 14 × 14.5 × 90   | 14         | 40.4      | 15.3                   | 34.0      | 285     |
| 9.1  | 18.4                  | 689     |                |                       |             |                |                    |            |           |                        | 46.       | 000     |
| 10.6 | 41.8                  | 688     |                | 8.9                   | 385         | 140            | W 21 × 8.25 × 68   | 211/8      | -         | 8.7                    | 12.4      | 280     |
| 12.0 | 30.2                  | 658     | 9.2            | 15.8                  | 368         | 134            | W 16 × 10.25 × 77  | 161/2      | -         | 10.9                   | 21.9      | 268     |
| 13.2 | 00.2                  |         |                |                       |             |                |                    |            |           |                        |           |         |
|      |                       |         |                |                       |             | new resser     |                    | Brak Brain |           |                        |           | name of |
|      |                       |         |                |                       |             |                |                    |            |           |                        |           |         |
|      |                       |         |                |                       |             |                |                    |            |           |                        |           |         |



 $S_{x}$ 

### ALLOWABLE STRESS DESIGN SELECTION TABLE

For shapes used as beams

 $E_y = 50 \text{ ksi}$   $L_u$ Ft.

6.0 7.3

43 5.1

6.2

4.0 5.1 11.9 6.7 9.4

4.1

1.6 4.6 5.9 12.6 5.2 6.8

3.8

28 2.9

25 2.5

28 2.8

14 3.4

4.8

Presently not availa

|       | $F_y = 50 \text{ ks}$ | si      | Sx             |                   | Depth | $F_{\nu}$ |  | $F_y = 36  \text{k}$ | si         |
|-------|-----------------------|---------|----------------|-------------------|-------|-----------|--|----------------------|------------|
| $L_c$ | $L_{u}$               | $M_R$   | 3 <sub>X</sub> | Shape             | d     | -3        | $L_c$  | Lu                   | $M_R$      |
| Ft.   | Ft.                   | Kip-ft. | In.3           |                   | In.   | Ksi       | Ft.  | Ft.                  | Kip-ft     |
| 5.8   | 5.8                   | 365     | 133            | W 24 × 7 × 62     | 233/4 | _         | 7.4  | 8.1                  | 265        |
| 6.8   | 11.2                  | 348     | 127            | W 18 × 7.5 ×71    | 181/2 | -         | 8.1  | 15.5                 | 253        |
| 7.4   | 8.0                   | 348     | 127            | W 21 × 8.25 × 62  | 21    | _         | 8.7  | 11.2                 | 253        |
| 9.1   | 20.2                  | 338     | 123            | W 14 × 10 × 82    | 141/4 |           | 10.7   | 28.0                 | 246        |
| 10.9  | 26.1                  | 324     | 118            | W 12 × 12 × 87    | 121/2 |           |  |                      |            |
| 9.2   | 13.9                  | 321     | 117            | W 16 × 10.25 × 67 | 163/8 | _         | 12.8   | 36.3                 | 236        |
| 6.8   | 10.3                  | 321     | 117            | W 18 × 7.5 × 65   | 183/8 | -         | 8.0  | 14.4                 | 233<br>233 |
| 5.0   | 5.0                   | 319     | 116            | W 24 × 7 × 55     | 235/8 | _         | 6.9  | 7.4                  | 232        |
| 9.0   | 18.6                  | 308     | 112            | W 14×10 ×74       | 141/8 | _         | 10.6   | 25.8                 | 224        |
| 5.9   | 6.7                   | 306     | 111            | W 21 × 6.5 × 57   | 21    |           | 6.9  | 9.4                  | 222        |
| 6.8   | 9.6                   | 296     | 108            | W 18 × 7.5 × 60   | 181/4 | _         | 8.0  | 13.3                 | 215        |
| 10.8  | 23.9                  | 294     | 107            | W 12 × 12 × 79    | 123/8 | 62.6      | 12.8   | 33.2                 | 214        |
| 9.0   | 17.2                  | 283     | 103            | W 14×10 ×68       | 14    | -         | 10.6   | 23.8                 | 205        |
| 6.7   | 8.7                   | 270     | 98.3           | W 18 × 7.5 × 55   | 101/- |           | 7.0  |                      | 100        |
| 10.8  | 22.0                  | 267     | 97.4           |                   | 181/8 | -         | 7.9  | 12.1                 | 196        |
| 10.6  | 22.0                  | 207     | 37.4           | W 12 × 12 × 72    | 121/4 | 52.3      | 12.7   | 30.5                 | 194        |
| 5.6   | 5.6                   | 261     | 94.9           | W 21 × 6.5 × 50   | 207/8 | -         | 6.9  | 7.8                  | 189        |
| 6.4   | 10.3                  | 253     | 92.2           | W 16 × 7 × 57     | 163/8 | -         | 7.5  | 14.3                 | 184        |
| 9.0   | 15.5                  | 253     | 92.2           | W 14 × 10 × 61    | 137/8 | -         | 10.6   | 21.5                 | 184        |
| 6.7   | 7.9                   | 244     | 88.9           | W 18 × 7.5 × 50   | 18    | _         | 7.9  | 11.0                 | 177        |
| 10.7  | 20.0                  | 237     | 87.9           | W 12 × 12 × 65    | 121/8 | 43.0      | 12.7   | 27.7                 | 175        |
| 4.7   | 4.7                   | 225     | 82.0           | W 21 × 6.5 × 44   | 205/8 | _         | 6.6  | 6.9                  | 164        |
| 6.3   | 9.1                   | 222     | 81.0           | W 16 × 7 × 50     | 161/4 | _         | 7.5  | 12.7                 | 162        |
| 5.4   | 6.8                   | 217     | 79.0           | *W 18 × 6 × 46    | 18    |           | 6.4  | 9.4                  | 157        |
| 9.0   | 17.5                  | 214     | 78.0           | W 12 × 10 × 58    | 121/4 | -         | 10.6   | 24.3                 | 156        |
| 7.2   | 12.7                  | 213     | 77.8           | *W 14 × 8 × 53    | 137/8 |           | 8.5  | 17.7                 | 155        |
| 6.3   | 8.2                   | 199     | 72.7           | W 16 × 7 × 45     | 161/8 | -         | 7.4  | 11.4                 | 145        |
| 9.0   | 15.9                  | 194     | 70.6           | W 12 × 10 × 53    | 12    | 55.9      | 10.6   | 22.1                 | 141        |
| 7.2   | 11.5                  | 193     | 70.3           | *W 14 × 8 × 48    | 133/4 | -         | 8.5  | 16.0                 | 140        |
| 5.4   | 5.9                   | 188     | 68.5           | *W 18 × 6 × 40    | 177/8 |           | 6.3  | 8.2                  | 197        |
| 9.0   | 22.4                  | 183     | 66.7           | W 10 × 10 × 60    | 101/4 | _         | 10.6   | 31.1                 | 137        |
|       |                       |         |                |                   |       |           |  |                      |            |
| 6.3   | 7,4                   | 177     | 64.7           | W 16 × 7 × 40     | 16    | -         | 7.4  | 10.2                 | 129        |
| 7.2   | 14.1                  | 177     | 64.7           | *W 12 × 8 × 50    | 121/4 | -         | 8.5  | 19.6                 | 129        |
| 7.2   | 10.3                  | 172     | 62.7           | *W 14 × 8 × 43    | 135/8 | -         | 8.4  | 14.4                 | 125        |
| 9.0   | 20.4                  | 165     | 60.0           | W 10 × 10 × 54    | 101/8 | 63.5      | 10.6   | 28.3                 | 120        |
| 7.2   | 12.8                  | 159     | 58.1           | *W 12 × 8 × 45    | 12    |           | 8.5  | 17.8                 | 116        |
| 4.8   | 4.8                   | 158     | 57.8           | *W 18 × 6 × 35    | 172/4 | -         | 6.3  | 6.7                  | 115        |
| 6.3   | 6.3                   | 155     | 56.5           | W 16 × 7 × 36     | 157/8 | 64.0      | 7.4  | 8.8                  | 113        |
| 6.1   | 8.2                   | 150     | 54.6           | W 14 × 6.75 × 38  | 141/8 | -         | 7.1  | 11.4                 | 109        |
|       | 18.7                  | 150     | 54.6           | W 10 × 10 × 49    | 10    | 53.0      | 10.6   | 26.0                 | 109        |
| 7.2   | 11.5                  | 142     | 51.9           | *W 12 × 8 × 40    | 12    | -         | 8.4  | 16.0                 | 103        |
| 7.2   | 16.4                  | 135     | 49.1           | W 10 × 8 × 45     | 101/8 | -         | 8.5  | 22.8                 | 98         |
|       |                       |         |                |                   |       |           | A CONTRACTOR OF THE PARTY OF TH |                      |            |

<sup>\*</sup> Presently not available in our rolling program.



### ABLE

## ALLOWABLE STRESS DESIGN SELECTION TABLE For shapes used as beams

Sx

| _          |                      |                   |       |                         |         |              |                                  |       |            |       |                       |         |
|------------|----------------------|-------------------|-------|-------------------------|---------|--------------|----------------------------------|-------|------------|-------|-----------------------|---------|
|            | $F_y = 36 \text{ k}$ | si                | 10000 | $F_{y} = 50 \text{ ks}$ | si      |              |                                  | Depth | r '        |       | $F_y = 36 \text{ ks}$ | si      |
| Lc         | $L_{u}$              | MR                | Lc    | Lu                      | $M_R$   | $S_x$        | Shape                            | d     | $F_{y}$    | $L_c$ | Lu                    | $M_R$   |
| Ft.        | Ft.                  | Kip-ft.           | Ft.   | Ft.                     | Kip-ft. | In.3         |                                  | In.   | Ksi        | Ft.   | Ft.                   | Kip-ft. |
| 7.4<br>8.1 | 8.1<br>15.5          | 265<br>253        | 6.0   | 7.3                     | 133     | 48.6         | W 14 × 6.75 × 34                 | 14    | -          | 7.1   | 10.2                  | 97      |
| 8.7        |                      | 200               | 4.9   | 5.1                     | 130     | 47.3         | *W 16 × 5.5 × 31                 | 157/8 | -          | 5.8   | 7.1                   | 94      |
|            | 11.2                 | 253               | 5.9   | 9.1                     | 125     | 45.6         | W 12 × 6.5 × 35                  | 121/2 | -          | 6.9   | 12.6                  | 91      |
| 10.7       | 28.0                 | 246               | 7.2   | 14.2                    | 115     | 42.1         | W 10 × 8 × 39                    | 97/8  | -          | 8.4   | 19.8                  | 84      |
| 10.8       | 19.3                 | 236<br>233<br>233 | 6.0   | 6.2                     | 115     | 42.0         | W 14 × 6.75 × 30                 | 137/8 | 55.3       | 7.1   | 8.7                   | 83      |
| 6.9        | 7.4                  | 232               | 5.8   | 7.7                     | 106     | 38.6         | W 12 × 6.5 × 30                  | 123/8 | -          | 6.9   | 10.8                  | 77      |
| 10.6       | 25.8                 | 224               | 4.0   | 4.0                     | 106     | 38.6         | *W 16 × 5.5 × 26                 | 153/4 | _          | 5.6   | 6.0                   | 77      |
| 6.9        | 9.4                  | 222               | 4.5   | 5.1                     | 97      | 35.4         | *W 14×5 ×26                      | 137/8 | _          | 5.3   | 7.0                   | 70      |
| 8.0        | 13.3                 | 215               | 7.1   | 11.9                    | 96      | 35.0         | W 10×8 ×33                       | 93/4  | 50.5       | 8.4   | 16.5                  | 70      |
| 12.8       | 33.2                 | 214               |       | 11.0                    |         | 00.0         |                                  |       |            |       |                       |         |
| 10.6       | 23.8                 | 205               | 5.8   | 6.7                     | 91      | 33.4         | W 12 × 6.5 × 26                  | 121/4 | 57.9       | 6.9   | 9.3                   | 66      |
|            | 20.0                 | 200               | 5.2   | 9.4                     | 89      | 32.4         | W 10 × 5.75 × 30                 | 101/2 | _          | 6.1   | 13.1                  | 64      |
| 7.9        | 12.1                 | 196               | 7.2   | 16.3                    | 85      | 31.2         | W 8×8 ×35                        | 81/8  | 64.4       | 8.5   | 22.6                  | 62      |
| 12.7       | 30.5                 | 194               | 1.2   | 10.0                    | 00      | 01.2         | W 0 × 0 × 00                     | 0,0   | 0 1.1      | 0.0   |                       |         |
|            |                      |                   | 4.1   | 4.1                     | 80      | 29.1         | *W 14 × 5 × 22                   | 133/4 | _          | 5.3   | 5.6                   | 58      |
| 6.9        | 7.8                  | 189               | 5.2   | 8.2                     | 76      | 27.9         | W 10 × 5.75 × 26                 | 103/8 | -          | 6.1   | 11.4                  | 55      |
| 7.5        | 14.3                 | 184               | 7.2   | 14.5                    | 75      | 27.5         | W 8×8 ×31                        | 8     | 50.0       | 8.4   | 20.1                  | 54      |
| 10.6       | 21.5                 | 184               |       |                         |         |              |                                  |       |            |       |                       |         |
|            |                      |                   | 3.6   | 4.6                     | 69      | 25.4         | *W 12 × 4 × 22                   | 121/4 | -          | 4.3   | 6.4                   | 50      |
| 7.9        | 11.0                 | 177               | 5.9   | 12.6                    | 66      | 24.3         | W 8×6.5 ×28                      | 8     | -          | 6.9   | 17.5                  | 48      |
| 12.7       | 27.7                 | 175               | 5.2   | 6.8                     | 63      | 23.2         | W 10 × 5.75 × 22                 | 101/8 | -          | 6.1   | 9.4                   | 46      |
| 6.6        | 6.9                  | 164               | 3.6   | 3.8                     | 58      | 21.3         | *W 12 × 4 × 19                   | 121/8 | _          | 4.2   | 5.3                   | 42      |
| 7.5        | 12.7                 | 162               | 5.8   | 10.9                    | 57      | 20.9         | W 8×6.5 ×24                      | 77/8  | 64.1       | 6.9   | 15.2                  | 41      |
| 6.4        | 9.4                  | 157               | 3.6   | 5.2                     | 51      | 18.8         | *W 10 × 4 × 19                   | 101/4 | _          | 4.2   | 7.2                   | 37      |
| 10.6       | 24.3                 | 156               | 4.7   | 8.5                     | 49      | 18.2         | W 8 × 5.25 × 21                  | 81/4  | _          | 5.6   | 11.8                  | 36      |
| 8.5        | 17.7                 | 155               |       |                         | 4.7     | 47.4         | *W 12 × 4 × 16                   | 12    | _          | 4.1   | 4.3                   | 34      |
| 7.4        | 11.4                 | 145               | 2.9   | 2.9                     | 47      | 17.1<br>16.2 | *W 12 × 4 × 16<br>*W 10 × 4 × 17 | 101/8 |            | 4.2   | 6.1                   | 32      |
| 10.6       | 22.1                 | 141               | 3.6   | 4.4<br>7.1              | 44      | 15.2         | W 8×5.25×18                      | 81/8  | The second | 5.5   | 9.9                   | 30      |
| 8.5        | 16.0                 | 140               | 4./   | 7.1                     | 41      | 15.2         | W 6 X 5.25 X 16                  |       | 12591      |       |                       |         |
| 6.3        | 8.2                  | 137               | 2.5   | 2.5                     | 40      | 14.9         | *W 12 × 4 × 14                   | 117/8 | 54.3       | 3.5   | 4.2                   | 29      |
|            | 31.1                 | 133               | 3.6   | 3.6                     | 37      | 13.8         | *W 10 × 4 × 15                   | 10    | _          | 4.2   | 5.0                   | 27      |
| 10.6       | 01.5                 |                   | 5.4   | 11.8                    | 36      | 13.4         | W 6×6 ×20                        | 61/4  | 62.1       | 6.4   | 16.4                  | 26      |
|            | 10.2                 | 129               | 3.6   | 5.2                     | 32      | 11.8         | *W 8×4 ×15                       | 81/8  | -          | 4.2   | 7.2                   | 23      |
| 7.4        | 19.6                 | 129               |       |                         |         |              |                                  |       |            |       |                       |         |
| 8.5        | 14.4                 | 125               | 2.8   | 2.8                     | 29      | 10.9         | *W 10 × 4 × 12                   | 97/8  | 47.5       | 3.9   | 4.3                   | 21      |
| 8.4        | 28.3                 | 120               | 3.6   | 8.7                     | 28      | 10.2         | *W 6×4 ×16                       | 61/4  | -          | 4.3   | 12.0                  | 20      |
| 10.6       | 17.8                 | 116               | 3.6   | 4.3                     | 27      | 9.91         | *W 8×4 ×13                       | 8     | -          | 4.2   | 5.9                   | 19      |
| 8.5        | 17.0                 |                   | 5.4   | 8.7                     | 25      | 9.72         | W 6×6 ×15                        | 6     | 31.8       | 6.3   | 12.0                  | 19      |
|            | 6.7                  | 115               | 4.5   | 12.0                    | 23      | 8.55         | W 5×5 ×16                        | 5     | -          | 5.3   | 16.6                  | 17      |
| 6.3        | 8.8                  | 113               |       |                         |         |              |                                  |       | 45.0       | 4.0   | 4.7                   | 15      |
| 7.4        | 11.4                 | 109               | 3.4   | 3.4                     | 21      | 7.81         | *W 8×4 ×10                       | 77/8  | 45.8       | 4.2   | 4.7                   | 15      |
| 7.1        | 26.0                 | 109               | 3.6   | 6.2                     | 20      | 7.31         | *W 6×4 ×12                       | 6     |            | 4.2   | 8.6                   | 14      |
| 10.6       | 16.0                 | 103               | 3.5   | 4.8                     | 15      | 5.56         | *W 6×4 × 9                       | 57/8  | 50.3       | 4.2   | 6.6                   | 11      |
|            | 22.8                 | 98                | 3.5   |                         | 15      | 5.56         | M 4×4 ×13                        | 4     | - 00.0     | 4.2   | 16.9                  | 10      |
| 8.5        |                      |                   | 0.0   | 12.2                    | 14      | 5.20         | IVI 4 X 4 X 13                   | 7     |            | ,     | 10.0                  |         |
|            |                      | -                 |       |                         |         |              |                                  |       |            |       |                       |         |

<sup>\*</sup> Presently not available in our rolling program

 $\mathbf{Z}_{\mathsf{x}}$ 

### PLASTIC DESIGN SELECTION TABLE For W and WTM shapes

| -                      |                       |                   |                      |   |                 |                  |                     |                          |                  |  |
|------------------------|-----------------------|-------------------|----------------------|---|-----------------|------------------|---------------------|--------------------------|------------------|--|
| $F_y = 50 \text{ ksi}$ |                       |                   | 7                    |   |                 |                  |                     | $F_{y} = 36 \text{ ksi}$ |                  |  |
| $M_p$                  | $P_{y}$               | A                 | $Z_x$                | Shape   | $\frac{d}{t_w}$ | rx               | ry                  | $M_{p}$                  | $P_{\nu}$        |  |
| Kip-ft.                | Kip                   | In.2              | In.3                 |   | w               | In.              | In.                 | Kip-ft.                  | Kip.             |  |
| 15900                  | 12400                 | 249               | 3830                 | WTM 36 × 16.5 × 848   | 16.8            | 16.4             | 4.27                | 11500                    | 8960             |  |
| 14900                  | 11700                 | 234               | 3570                 | WTM 36 × 16.5 × 798   | 17.6            | 16.4             | 4.24                | 10700                    | 8420             |  |
|                        |                       |                   |                      |   |                 |                  |                     |                          |                  |  |
| 13300                  | 10500                 | 211               | 3190                 | WTM 36 × 16.5 × 720   | 19.0            | 16.2             | 4.18                | 9560                     | 7600             |  |
| 12700                  | 9600                  | 192               | 3060                 | WTM 40 × 16 × 655   | 22.1            | 17.2             | 3.86                | 9180                     | 6910             |  |
| 11800                  | 9500                  | 190               | 2840                 | WTM 36 × 16.5 × 650   | 20.5            | 16.0             | 4.12                | 8520                     | 6840             |  |
| 11500                  | 8700                  | 174               | 2750                 | WTM 40 × 16 × 593   | 24.0            | 17.0             | 3.81                | 8260                     | 6260             |  |
| 10700                  | 9050                  | 181               | 2560                 | WTM 33 × 15.75 × 619  | 19.5            | 15.2             | 3.98                | 7690                     | 6520             |  |
| 10600                  | 8600                  | 172               | 2550                 | WTM 36 × 16.5 × 588   | 22.3            | 15.9             | 4.07                | 7650                     | 6190             |  |
| 10400                  | 8200                  | 164               | 2500                 | WTM 40 × 12 × 561   | 22.1            | 16.6             | 2.82                | 7490                     | 5900             |  |
| 10200                  | 7800                  | 156               | 2450                 | WTM 40 × 16 × 531   | 26.3            | 16.9             | 3.75                | 7350                     | 5620             |  |
| 9730                   | 8300                  | 166               | 2330                 | WTM 33 × 15.75 × 567  | 20.9            | 15.1             | 3.94                | 7000                     | 5980             |  |
| 9720                   | 8050                  | 161               | 2330                 | WTM 36 × 12 × 548   | 20.8            | 15.7             | 2.93                | 7000                     | 5800             |  |
| 9600                   | 7600                  | 152               | 2300                 | WTM 40 × 12 × 520   | 23.6            | 16.5             | 2.78                | 6910                     | 5470             |  |
| 9440                   | 7700                  | 154               | 2270                 | WTM 36 × 16.5 × 527   | 24.4            | 15.8             | 4.02                | 6800                     | 5540             |  |
| 9210                   | 8500                  | 170               | 2210                 | WTM 30 × 15 × 581   | 18.0            | 13.9             | 3.86                | 6630                     | 6120             |  |
| 9090                   | 7000                  | 140               | 2180                 | WTM 40 × 16 × 480   | 28.6            | 16.8             | 3.72                | 6540                     | 5040             |  |
| 8940                   | 7450                  | 149               | 2140                 | WTM 36 × 12 × 508   | 22.2            | 15.6             | 2.90                | 6430                     | 5360             |  |
| 8790                   | 7550                  | 151               | 2110                 | WTM 33 × 15.75 × 515  | 22.6            | 14.9             | 3.89                | 6330                     | 5440             |  |
| 8710                   | 6950                  | 139               | 2090                 | WTM 40 × 12 × 475   | 25.2            | 16.4             | 2.74                | 6270                     | 5000             |  |
| 8640                   | 7100                  | 142               | 2070                 | WTM 36 × 16.5 × 485   | 25.8            | 15.6             | 3.98                | 6220                     | 5110             |  |
| 8570                   | 7600                  | 152               | 2060                 | WTM 33 × 11.5 × 520   | 19.5            | 14.7             | 2.88                | 6170                     | 5470             |  |
| 8280                   | 7700                  | 154               | 1990                 | WTM 30 × 15 × 526   | 19.4            | 13.8             | 3.80                | 5960                     | 5540             |  |
| 8270                   | 6400                  | 128               | 1980                 | WTM 40 × 16 × 436   | 30.9            | 16.6             | 3.67                | 5950                     | 4610             |  |
| 8080                   | 6800                  | 136               | 1940                 | WTM 36 × 12 × 464   | 23.7            | 15.5             | 2.85                | 5820                     | 4900             |  |
| 7990                   | 7500                  | 150               | 1920                 | WTM 32 × 12 × 511   | 18.3            | 13.8             | 2.96                | 5750                     | 5400             |  |
| 7980                   | 6400                  | 128               | 1910                 | WTM 40 × 12 × 437   | 27.0            | 16.3             | 2.69                | 5740                     | 4610             |  |
| 7900                   | 6850                  | 137               | 1890                 | WTM 33 × 15.75 × 468  | 24.2            | 14.8             | 3.85                | 5680                     | 4930             |  |
| 7840                   | 7900                  | 158               | 1880                 | WTM 27 × 14 × 539   | 16.5            | 12.7             | 3.66                | 5640                     | 5690             |  |
| 7780                   | 6950                  | 139               | 1870                 | WTM 33 × 11.5 × 476   | 21.0            | 14.6             | 2.84                | 5600                     | 5000             |  |
| 7730                   | 6400                  | 128               | 1860                 | WTM 36 × 16.5 × 439   | 28.1            | 15.6             | 3.95                | 5570                     | 4610             |  |
| 7470                   | 7000                  | 140               | 1790                 | WTM 30 × 15 × 477   | 21.0            | 13.7             | 3.75                | 5380                     | 5040             |  |
| 7450                   | 5800                  | 116               | 1790                 | WTM 40 × 16 × 397   | 33.6            | 16.6             | 3.65                | 5370                     | 4180             |  |
| 7390                   | 6250                  | 125               | 1770                 | WTM 36 × 12 × 426   | 25.4            | 15.4             | 2.82                | 5320                     | 4500             |  |
| 7190                   | 5800                  | 116               | 1720                 | WTM 40 × 12 × 396   | 29.3            | 16.2             | 2.66                | 5170                     | 4180             |  |
| 7160                   | 6950                  | 139               | 1720                 | WTM 30 × 10.5 × 475   | 18.0            | 13.4             | 2.67                | 5160                     | 5000             |  |
| 7130                   | 7250                  | 145               | 1710                 | WTM 27 × 14 × 494   | 17.7            | 12.6             | 3.61                | 5140                     | 5220             |  |
| 7120                   | 6750                  | 135               | 1710                 | WTM 32 × 12 × 462   | 19.7            | 13.7             | 2.92                | 5120                     | 4860             |  |
| 7100                   | 6200                  | 124               | 1700                 | WTM 33 × 15.75 × 424  | 26.3            | 14.7             | 3.81                | 5110                     | 4460             |  |
| 7000                   | 6300                  | 126               | 1680                 | WTM 33 × 11.5 × 432   | 22.6            | 14.5             | 2.79                | 5040                     | 4540             |  |
|                        |                       |                   |                      |   |                 |                  |                     |                          |                  |  |
| 6920                   | 5750                  | 115               | 1660                 | WTM 36 × 16,5 × 393   | 31,0            | 15.5             | 3.90                | 4980                     | 4140             |  |
|                        | 5750<br>10700<br>7100 | 115<br>214<br>142 | 1660<br>1650<br>1630 | WTM 36 x 16,5 x 393<br>W 14 x 16 x 730<br>WTM 28 x 12 x 485 | 31,0<br>7.3     | <b>15.5</b> 8.19 | <b>3.90</b><br>4.69 | <b>4980</b><br>4960      | <b>4140</b> 7700 |  |

 $f_v = 50 \text{ ksi}$ 

\* Check shape for cor when subjected to c



### PLASTIC DESIGN SELECTION TABLE For W and WTM shapes

 $Z_{x}$ 

| -   | $F_y = 3$ | 36 ksi       | $F_{\gamma} = 50 \text{ ksi}$ |           |      | 7       |                      | ,               |       |      | $F_{\nu} = 36 \text{ ksi}$ |            |  |
|-----|-----------|--------------|-------------------------------|-----------|------|---------|----------------------|-----------------|-------|------|----------------------------|------------|--|
| 1   | $M_p$     | Py           | M <sub>D</sub>                | $P_{\nu}$ | A    | $Z_x$   | Shape                | $\frac{d}{t_w}$ | $r_x$ | ry   | $M_p$                      | $P_{y}$    |  |
| +   | Kip-ft.   | Kip.         | Kip-ft.                       | Kip       | In.2 | In.3    |                      |                 | In.   | ln.  | Kip-ft.                    | Kip.       |  |
|     | 11500     | 8960         | 6770                          | 5300      | 106  | 1630    | WTM 40 × 16 × 362    | 36.2            | 16.5  | 3.61 | 4880                       | 3820       |  |
|     | 10700     |              | 6710                          | 6350      | 127  | 1610    | WTM 30 × 15 × 433    | 22.4            | 13.5  | 3.71 | 4830                       | 4570       |  |
|     | 10700     | 8420         | 6630                          | 5650      | 113  | 1590    | WTM 36 × 12 × 387    | 27.5            | 15.3  | 2.78 | 4770                       | 4070       |  |
|     | 9560      | 7600         | 6490                          | 6350      | 127  | 1560    | WTM 30 × 10.5 × 435  | 19.3            | 13.3  | 2.62 | 4670                       | 4570       |  |
|     |           | 1000         | 6460                          | 5850      | 117  | 1550    | WTM 33 × 11.5 × 398  | 24.0            | 14.3  | 2.74 | 4650                       | 4210       |  |
|     | 9180      | 6910         | 6450                          | 7200      | 144  | 1550    | WTM 24 × 12.75 × 492 | 15.1            | 11.5  | 3.41 | 4650                       | 5180       |  |
|     | 8520      | 6840         | 6450                          | 5250      | 105  | 1550    | WTM 40 × 12 × 359    | 31.7            | 16.1  | 2.62 | 4650                       | 3780       |  |
|     |           |              | 6440                          | 5650      | 113  | 1550    | WTM 33 × 15.75 × 387 | 28.5            | 14.7  | 3.79 | 4640                       | 4070       |  |
| - 1 | 8260      | 6260         | 6380                          | 6550      | 131  | 1530    | WTM 27 × 14 × 448    | 19.0            | 12.5  | 3.57 | 4590                       | 4720       |  |
|     | 7690      | 6520         | 6370                          | 6100      | 122  | 1530    | WTM 32 × 12 × 418    | 21.3            | 13.6  | 2.87 | 4590                       | 4390       |  |
|     | 7650      | 6190         | 6290                          | * 4820    | 96.4 | 1510    | W 40 × 18 × 328      | 44.0            | 16.7  | 4.15 | 4530                       | * 3470     |  |
|     | 7490      | 5000         | 6280                          | 5250      | 105  | 1510    | WTM 36 × 16.5 × 359  | 33.4            | 15.4  | 3.87 | 4520                       | 3780       |  |
|     | 7490      | 5900         | 6220                          | 6900      | 138  | 1490    | WTM 26 × 12 × 473    | 15.4            | 11.6  | 3.10 | 4480                       | 4970       |  |
|     | 7350      | 5620         | 6140                          | 9750      | 195  | 1470    | W 14 × 16 × 665      | 7.6             | 7.99  | 4.62 | 4420                       | 7020       |  |
|     | 7000      | 5980         | 6140                          | 6500      | 130  | 1470    | WTM 27 × 10 × 446    | 16.5            | 12.3  | 2.61 | 4420                       | 4680       |  |
|     | 7000      | 5800         |                               | 10000     | 323  |         | The second second    |                 |       | 0.57 | 4000                       | 0.404      |  |
|     | 7000      | 3000         | 6080                          | * 4770    | 95.3 | 1460    | WTM 40 × 16 × 324    | 40.2            | 16.4  | 3.57 | 4380                       | 343        |  |
|     | 6910      | 5470         | 6060                          | 6400      | 128  | 1450    | WTM 28 × 12 × 438    | 17.6            | 12.2  | 3.00 | 4360                       | 461        |  |
|     | 6800      | 5540         | 5960                          | 5700      | 114  | 1430    | WTM 30 × 15 × 391    | 24.4            | 13.5  | 3.68 | 4290                       | 410        |  |
|     | 6630      | 6120         | 5930                          | 5100      | 102  | 1420    | WTM 36 × 12 × 350    | 29.7            | 15.2  | 2.75 | 4270                       | 367<br>374 |  |
|     |           |              | 5900                          | 5200      | 104  | 1420    | WTM 33 × 15.75 × 354 | 30.6            | 14.5  | 3.74 | 4250                       | 346        |  |
| 2   | 6540      | 5040         | 5900                          | 4800      | 96.0 | 1420    | WTM 40 × 12 × 327    | 34.6            | 16.0  | 2.59 | 4250                       | 475        |  |
|     | 6430      | 5360         | 5860                          | 6600      | 132  | 1410    | WTM 24 × 12.75 × 450 | 16.1            | 11.4  | 3.36 | 4220<br>4190               | 414        |  |
|     | 6330      | 5440         | 5820                          | 5750      | 115  | 1400    | WTM 30 × 10.5 × 394  | 20.8            | 13.2  | 2.58 | 4140                       | 347        |  |
|     |           |              | 5750                          | * 4820    | 96.4 | 1380    | WTM 36 × 16.5 × 328  | 36.4            | 15.3  |      | 4130                       | 400        |  |
| 1   | 6270      | 5000         | 5740                          | 5550      | 111  | 1380    | WTM 32 × 12 × 380    | 22.8            | 13.4  | 2.83 | 4130                       | 378        |  |
| 3   | 6220      | 5110         | 5740                          | 5250      | 105  | 1380    | WTM 33 × 11.5 × 361  | 26.0            |       | 3.52 | 4130                       | 428        |  |
| 3   | 6170      | 5470         | 5730                          | 5950      | 119  | 1380    | WTM 27 × 14 × 407    | 20.3            | 12.3  | 3.52 | 4130                       | 420        |  |
| )   | 5960      | 5540         | 5700                          | * 4380    | 87.6 | 1370    | W 40 × 18 × 298      | 47.8            | 16.6  | 4.12 | 4100                       | * 315      |  |
|     |           | 4610         | 5690                          | 6700      | 134  | 1360    | WTM 24 × 12 × 457    | 14.5            | 10.9  | 3.14 | 4090                       | 482        |  |
| 7   | 5950      |              | 5580                          | 6250      | 125  | 1340    | WTM 26 × 12 × 427    | 16.5            | 11.5  | 3.05 | 4020                       | 450        |  |
| 5   | 5820      | 4900<br>5400 | 5580                          | 5950      | 119  | 1340    | WTM 27 × 10 × 407    | 17.7            | 12.2  | 2.56 | 4010                       | 428        |  |
| ô   | 5750      | - 10         | 0000                          | 3530      | 113  | 1040    | 11 11 E A 10 A 407   |                 |       |      |                            |            |  |
| 9   | 5740      | 4610<br>4930 | 5540                          | * 4370    | 87.4 | 1330    | WTM 40 × 16 × 297    | 42.8            | 16.3  | 3.54 | 3990                       | * 315      |  |
| 5   | 5680      | 5690         | 5460                          | 8850      | 177  | 1310    | W 14×16 ×605         | 8.1             | 7.82  | 4.56 | 3930                       | 637        |  |
| 6   | 5640      | 5000         | 5440                          | 5800      | 116  | 1310    | WTM 28 × 12 × 397    | 19.0            | 12.1  | 2.95 | 3920                       | 418        |  |
| 4   | 5600      | 4610         | 5430                          | 4680      | 93.5 | 1300    | WTM 36 × 12 × 318    | 32.4            | 15.1  | 2.71 | 3910                       | 337        |  |
| 5   | 5570      | 5040         | 5420                          | 5200      | 104  | 1300    | WTM 30 × 15 × 357    | 26.5            | 13.4  | 3.65 | 3900                       | 374        |  |
| 5   | 5380      | 2040         | 5310                          | 4880      | 97.5 | 1280    | WTM 33 × 11.5 × 332  | 27.7            | 14.1  | 2.67 | 3830                       | 351        |  |
|     | 5070      | 4180         | 5280                          | 4670      | 93.5 | 1270    | WTM 33 × 15.75 × 318 | 33.8            | 14.4  | 3.71 | 3800                       | 337        |  |
| 5   | 5370      | 4500         |                               |           |      |         |                      |                 | No.   |      |                            |            |  |
| 2   | 5320      | 4180         | 5280                          | * 4320    | 86.3 | 1270    | WTM 40 × 12 × 294    | 38.1            | 15.9  | 2.56 | 3800                       | 311        |  |
| 6   | 5170      | 5000         | 5270                          | 5250      | 105  | 1270    | WTM 30 × 10.5 × 358  | 22.2            | 13.0  | 2.53 | 3800                       | 378        |  |
| 7   | 5160      | 5220         | 5240                          | * 4410    | 88.3 | 1260    | W 36×16.5 ×300       | 38.9            | 15.2  | 3.83 | 3770                       | 318        |  |
| 1   | 5140      | 4860         | 5220                          | 5950      | 119  | 1250    | WTM 24 × 12.75 × 408 | 17.3            | 11.3  | 3.33 | 3760                       | 428        |  |
| 2   | 5120      | 4460         |                               |           | 245  | 3.11    | U.S. STATE OF        |                 |       |      |                            |            |  |
| 1   | 5110      | 4540         |                               |           | 167  | 1 7 7 7 | BIR LIEX NO          |                 |       |      |                            |            |  |
| 9   | 5040      | 40.10        |                               |           | 1    |         |                      |                 |       |      |                            |            |  |

Check shape for compliance with Formulas (2.7-1 a) or (2.7-1 b), Sect. 2.7, AISC Specification, as applicable, when subjected to combined axial force and bending moment at ultimate loading.

4960 7700

3.90

4.69 3.05 4890  $Z_{x}$ 

### PLASTIC DESIGN SELECTION TABLE For W and WTM shapes

| $F_y = 50 \text{ ksi}$ |         | A    | $Z_r$ |                      | 1               |                |      | $F_y = 36$ |         |
|------------------------|---------|------|-------|----------------------|-----------------|----------------|------|------------|---------|
| $M_p$                  | $P_{y}$ | 1    | Zx    | Shape                | $\frac{d}{t_w}$ | r <sub>x</sub> | ry   | $M_p$      | $P_{y}$ |
| Cip-ft.                | Kip     | In.2 | In.3  |                      |                 | In.            | In.  | Kip-ft.    | Kip.    |
| 5200                   | * 4070  | 81.3 | 1250  | W 40×16 ×277         | 47.8            | 16.4           | 3.58 | 3740       | * 293   |
| 5170                   | 5400    | 108  | 1240  | WTM 27 × 14 × 368    | 22.0            | 12.2           | 3.48 | 3720       | 389     |
| 5130                   | 5000    | 100  | 1230  | WTM 32 × 12 × 343    | 24.8            | 13.4           | 2.79 | 3700       | 360     |
| 5100                   | * 3940  | 78.8 | 1220  | W 40 × 18 × 268      | 52.5            | 16.5           | 4.09 | 3670       | * 284   |
| 5060                   | 6050    | 121  | 1210  | WTM 24 × 12 × 414    | 15.5            | 10.8           | 3.09 | 3640       | 436     |
| 5020                   | 5400    | 108  | 1200  | WTM 27 × 10 × 369    | 19.0            | 12.1           | 2.51 | 3610       | 389     |
| 4990                   | 5650    | 113  | 1200  | WTM 26 × 12 × 387    | 17.8            | 11.4           | 3.00 | 3590       | 407     |
| 4960                   | 4780    | 95.7 | 1190  | WTM 30 × 15 × 326    | 28.4            | 13.2           | 3.61 | 3570       | 344     |
| 4870                   | * 4120  | 82.4 | 1170  | W 36×16.5 ×280       | 41.3            | 15.1           | 3.81 | 3510       | 297     |
| 4870                   | 8050    | 161  | 1170  | W 14×16 ×550         | 8.5             | 7.65           | 4.50 | 3500       | 580     |
| 4860                   | 4200    | 84.0 | 1170  | WTM 36 × 12 × 286    | 35.7            | 15.0           | 2.68 | 3500       | 303     |
| 4860                   | 5250    | 105  | 1170  | WTM 28 × 12 × 360    | 20.3            | 12.0           | 2.91 | 3500       | 378     |
| 4810                   | 4430    | 88.6 | 1150  | WTM 33 × 11.5 × 302  | 30.2            | 14.1           | 2.65 | 3460       | 319     |
| 4810                   | 4280    | 85.6 | 1150  | WTM 33 × 15.75 × 291 | 36.3            | 14.4           | 3.69 | 3460       | 308     |
| 4740                   | 4750    | 95.0 | 1140  | WTM 30 × 10.5 × 323  | 24.1            | 12.9           | 2.49 | 3410       | 342     |
| 4720                   | * 3880  | 77.6 | 1130  | WTM 40 × 12 × 264    | 41.7            | 15.8           | 2.52 | 3400       | 279     |
| 4710                   | 4600    | 92.0 | 1130  | WTM 32 × 12 × 313    | 26.9            | 13.2           | 2.75 | 3390       | 331     |
| 4700                   | 5900    | 118  | 1130  | WTM 21 × 12.25 × 402 | 15.0            | 10.2           | 3.27 | 3380       | 425     |
| 4700                   | 4930    | 98.7 | 1130  | WTM 27 × 14 × 336    | 23.8            | 12.1           | 3.45 | 3380       | 355     |
| 4680                   | 5400    | 108  | 1120  | WTM 24 × 12.75 × 370 | 18.4            | 11.1           | 3.28 | 3370       | 389     |
| 4670                   | * 3660  | 73.3 | 1120  | W 40 × 16 × 249      | 52.5            | 16.3           | 3.56 | 3360       | * 264   |
| _                      | _       | 71.7 | 1100  | W 40×18 ×244         | 55.0            | 16.4           | 4.04 | 3300       | * 258   |
| 4560                   | 5500    | 110  | 1090  | WTM 24 × 12 × 375    | 16.6            | 10.6           | 3.04 | 3280       | 396     |
| 4520                   | 4920    | 98.3 | 1080  | WTM 27 × 10 × 335    | 20.3            | 11.9           | 2.46 | 3250       | 354     |
| 4500                   | 5150    | 103  | 1080  | WTM 26 × 12 × 351    | 19.0            | 11.2           | 2.95 | 3240       | 371     |
| 4490                   | * 3820  | 76.5 | 1080  | W - 36 × 16.5 × 260  | 43.2            | 15.0           | 3.78 | 3230       | * 275   |
| 4480                   | 5750    | 115  | 1070  | WTM 22 × 12 × 395    | 14.7            | 10.0           | 3.13 | 3220       | 414     |
| 4420                   | 4290    | 85.7 | 1060  | WTM 30 × 15 × 292    | 31.4            | 13.2           | 3.58 | 3180       | 309     |
| 4400                   | 4780    | 95.5 | 1060  | WTM 28 × 12 × 325    | 22.0            | 11.8           | 2.86 | 3170       | 344     |
| 4330                   | * 3770  | 75.4 | 1040  | WTM 36 × 12 × 256    | 39.0            | 14.9           | 2.65 | 3120       | 271     |
| 4330                   | * 3870  | 77.4 | 1040  | WTM 33 × 15.75 × 263 | 39.7            | 14.3           | 3.66 | 3120       | 279     |
| 4320                   | 7300    | 146  | 1040  | W 14×16 ×500         | 8.9             | 7.50           | 4.44 | 3110       | 526     |
| 4320                   | 5150    | 103  | 1040  | WTM 24 × 9 × 354     | 16.5            | 11.0           | 2.35 | 3110       | 371     |
| 4300                   | 3980    | 79.6 | 1030  | WTM 33 × 11.5 × 271  | 33.2            | 14.0           | 2.62 | 3100       | 287     |
| 4300                   | 4330    | 86.6 | 1030  | WTM 30 × 10.5 × 295  | 26.1            | 12.9           | 2.46 | 3090       | 312     |
| 4280                   | 4200    | 84.0 | 1030  | WTM 32 × 12 × 286    | 28.9            | 13.1           | 2.72 | 3080       | 302     |
| 4260                   | 4510    | 90.2 | 1020  | WTM 27 × 14 × 307    | 25.5            | 12.0           | 3.42 | 3070       | 325     |
| 4240                   | 4920    | 98.4 | 1020  | WTM 24 × 12.75 × 335 | 19.9            | 11.0           | 3.23 | 3050       | 354     |
| 1210                   | * 3450  | 68.9 | 1010  | W 40 × 12 × 235      | 47.8            | 15.9           | 2.54 | 3030       | * 248   |
| 4210                   | * 3600  | 72.1 | 1010  | W 36 × 16.5 × 245    | 45.1            | 15.0           | 3.75 | 3030       | * 259   |
| 4210                   | 5350    | 107  | 1010  | WTM 21 × 12.25 × 364 | 16.0            | 10.0           | 3.23 | 3030       | 385     |
| 4090                   | 5000    | 100  | 982   | WTM 24 × 12 × 343    | 17.8            | 10.5           | 3.01 | 2950       | 360     |
| 4050                   | 4440    | 88.9 | 973   | WTM 27 × 10 × 302    | 22.0            | 11.8           | 2.43 | 2920       | 320     |
| 4040                   | 4660    | 93.2 | 970   | WTM 26 × 12 × 317    | 20.6            | 11.1           | 2.91 | 2910       | 335     |

<sup>\*</sup> Check shape for compliance with Formulas (2.7-1 a) or (2.7-1 b), Sect. 2.7, AISC Specification, as applicable when subjected to combined axial force and bending moment at ultimate loading.

Check shape for cou

 $F_{\rm e} = 50 \, \rm ksi$ 

4890

Kip-ft.

3690 4130 3670 6650

3840 4490 3830 3570 3810 3760

3770 \* 3100 3710 4560

3660 4240 3650 4780

3610 3970

3610 6250



# PLASTIC DESIGN SELECTION TABLE For W and WTM shapes

 $Z_{x}$ 

|         | = 36 ksi | $F_{\nu} =$ | 50 ksi      |        | 7     |                       |                 |      |      | $F_{\nu} =$ | 36 ksi |
|---------|----------|-------------|-------------|--------|-------|-----------------------|-----------------|------|------|-------------|--------|
| Mp      | $P_y$    | $M_p$       | $P_{y}$     | A      | $Z_x$ | Shape                 | $\frac{d}{t_w}$ | rx   | ry   | $M_p$       | $P_y$  |
| Kip-ft. | Kip.     | Kip-ft.     | Kip         | In.2   | In.3  |                       | w               | In.  | In.  | Kip-ft.     | Kip.   |
| 3740    | * 2930   |             |             | 64.8   | 967   | W 40×18 ×221          | 54.5            | 16.0 | 3.90 | 2900        | * 2330 |
| 0/20    | 3890     |             |             | 04.0   | 307   | W 40 × 10 × 221       | 54.5            | 10.0 | 3.30 | 2500        | 2330   |
| 3700    | 3600     | 4010        | * 3170      | 63.3   | 963   | W 40×16 ×215          | 60.0            | 16.2 | 3.54 | 2890        | * 2280 |
| 3670    |          | 4000        | 5200        | 104    | 961   | WTM 22 × 12 × 357     | 15.8            | 9.87 | 3.09 | 2880        | 3740   |
| 00/0    | * 2840   | 3990        | 4350        | 87.0   | 957   | WTM 28 × 12 × 296     | 23.8            | 11.8 | 2.83 | 2870        | 3130   |
| 0010    | 4360     | 3930        | * 3380      | 67.6   | 943   | W 36 × 16.5 × 230     | 47.2            | 14.9 | 3.73 | 2830        | * 2440 |
| 0010    | 3890     | 3920        | 3840        | 76.7   | 941   | WTM 30 × 15 × 261     | 34.0            | 13.1 | 3.54 | 2820        | 2760   |
| 3590    | 4070     | 3910        | * 3540      | 70.9   | 939   | W 33 × 15.75 × 241    | 41.2            | 14.1 | 3.63 | 2820        | 2550   |
| 3570    | 3440     | 3910        | 4690        | 93.7   | 938   | WTM 24 × 9 × 319      | 17.8            | 10.8 | 2.29 | 2810        | 3370   |
| 3510    | 2970     | 3900        | * 3410      | 68.1   | 936   | WTM 36 × 12 × 232     | 42.7            | 14.8 | 2.62 | 2810        | 2450   |
| 3500    | 5800     | 3900        | 3960        | 79.1   | 935   | WTM 30 × 10.5 × 269   | 28.0            | 12.8 | 2.43 | 2810        | 2850   |
| 3500    | 3030     | 3890        | 4130        | 82.6   | 933   | WTM 27 × 14 × 281     | 27.6            | 12.0 | 3.40 | 2800        | 2980   |
| 3500    | 3780     | 3870        | 6650        | 133    | 929   | W 14×16 ×455          | 9.4             | 7.35 | 4.39 | 2790        | 4790   |
| 3460    | 3190     | 3840        | 4490        | 89.8   | 922   | WTM 24 × 12.75 × 306  | 21.5            | 10.9 | 3.20 | 2770        | 3230   |
| 3460    | 3080     | 3830        | 3570        | 71.4   | 919   | WTM 33 × 11.5 × 243   | 36.3            | 13.9 | 2.58 | 2760        | 2570   |
| 3410    | 3420     | 3810        | 3760        | 75.2   | 915   | WTM 32 × 12 × 256     | 32.0            | 13.1 | 2.68 | 2750        | 2710   |
|         |          | 3810        | 4890        | 97.9   | 915   | WTM 21 × 12.25 × 333  | 17.1            | 9.91 | 3.19 | 2740        | 3520   |
| 3400    | 2790     |             |             | 3550   |       |                       |                 |      |      | 2.10        |        |
| 3390    | 3310     | 3770        | * 3100      | 62.0   | 905   | W 40 × 12 × 211       | 52.5            | 15.8 | 2.51 | 2720        | * 2230 |
| 3380    | 4250     | 3710        | 4560        | 91.2   | 891   | WTM 24 × 12 × 310     | 19.2            | 10.4 | 2.96 | 2670        | 3280   |
| 3380    | 3550     | 3660        | 4240        | 84.9   | 878   | WTM 26 × 12 × 289     | 22.3            | 11.0 | 2.88 | 2630        | 3060   |
| 3370    | 3890     | 3650        | 4780        | 95.6   | 877   | WTM 22 × 12 × 326     | 16.9            | 9.73 | 3.03 | 2630        | 3440   |
| 3360    | * 2640   | -           | -           | 58.4   | 868   | W 40×16 ×199          | 59.5            | 16.0 | 3.45 | 2600        | * 2100 |
|         |          | 3610        | 3970        | 79.5   | 867   | WTM 28 × 12 × 270     | 25.6            | 11.7 | 2.80 | 2600        | 2860   |
| 3300    | * 2580   | 3610        | 6250        | 125    | 866   | W 14×16 ×426          | 10.0            | 7.26 | 4.35 | 2600        | 4500   |
| 3280    | 3960     | 3600        | 3980        | 79.5   | 864   | WTM 27 × 10 × 271     | 24.1            | 11.7 | 2.39 | 2590        | 2860   |
| 3250    | 3540     | 3560        | * 3250      | 65.0   | 855   | W 33 × 15.75 × 221    | 43.8            | 14.1 | 3.59 | 2570        | * 2340 |
| 3240    | 3710     | 3550        | 3620        | 72.4   | 853   | WTM 30 × 10.5 × 246   | 30.3            | 12.7 | 2.40 | 2560        | 2610   |
| 3230    | * 2750   | 3540        | 3790        | 75.7   | 850   | WTM 27 × 14 × 258     | 29.6            | 11.9 | 3.37 | 2550        | 2730   |
| 3220    | 4140     | 3530        | 4270        | 85.5   | 847   | WTM 24 × 9 × 291      | 19.1            | 10.7 | 2.25 | 2540        | 3080   |
| 3180    | 3090     | 3520        | * 3450      | 69.0   | 845   | WTM 30 × 15 × 235     | 37.7            | 13.0 | 3.52 | 2530        | 2490   |
| 3170    | 3440     | 3480        | 4100        | 82.0   | 835   | WTM 24 × 12.75 × 279  | 23.0            | 10.8 | 3.17 | 2510        | 2950   |
| 3120    | 2710     | 3470        | * 3090      | 61.8   | 833   | W 36×12 ×210          | 44.2            | 14.6 | 2.58 | 2500        | * 2230 |
| 3120    | 2790     | 3470        | 3440        | 68.8   | 832   | WTM 32 × 12 × 234     | 34.3            | 13.0 | 2.66 | 2500        | 2480   |
| 3110    | 5260     | 3440        | * 3220      | 64.5   | 826   | WTM 33 × 11.5 × 219   | 39.7            | 13.8 | 2.56 | 2480        | 2320   |
| 3110    | 3710     | 3400        | 4410        | 88.2   | 816   | WTM 21 × 12.25 × 300  | 18.6            | 9.81 | 3.15 | 2450        | 3170   |
| 3100    | 2870     | 3340        | 5840        | 117    | 801   | W 14 × 16 × 398       | 10.3            | 7.16 | 4.31 | 2400        | 4210   |
| 3090    | 3120     | 3310        | 3870        | 77.5   | 795   | WTM 26 × 12 × 264     | 23.9            | 10.9 | 2.85 | 2380        | 2790   |
| 3080    | 3020     | 3310        | 4110        | 82.1   | 794   | WTM 24 × 12 × 280     | 20.7            | 10.3 | 2.92 | 2380        | 2960   |
|         | 3250     | 3290        | 3630        | 72.7   | 790   | WTM 28 × 12 × 247     | 27.7            | 11.6 | 2.77 | 2370        | 2620   |
| -050    | 3540     | 3270        | 4340        | 86.7   | 786   | WTM 22 × 12 × 295     | 18.0            | 9.61 | 3.00 | 2360        | 3120   |
|         | * 2480   | 3260        | 3620        | 72.5   | 782   | WTM 27 × 10 × 247     | 25.9            | 11.6 | 2.36 | 2340        | 2610   |
| 3030    | * 2590   |             | 15 1500     | 1941   |       |                       |                 |      |      |             |        |
| 0000    | 3850     |             | THE RESERVE | 1 (92) |       | 1 1 1 1 1 1 1 1 1 1 1 |                 |      |      |             |        |
| 2050    | 3600     | 10000       | 13 TO 1     | 10.7   |       |                       |                 |      |      |             |        |
|         | 3200     |             |             |        |       |                       |                 |      |      |             |        |
|         | 3350     |             |             |        |       |                       |                 |      |      |             |        |
| 2910    |          |             |             |        |       |                       |                 |      |      |             |        |
|         |          |             |             |        |       |                       |                 |      |      |             |        |

Check shape for compliance with Formulas (2.7-1 a) or (2.7-1 b), Sect. 2.7, AISC Specification, as applicable, when subjected to combined axial force and bending moment at ultimate loading.

specification, as applicable,

 $Z_{x}$ 

## PLASTIC DESIGN SELECTION TABLE For W and WTM shapes

 $F_{\rm e} = 50 \, \text{ksi}$ 

\* 2210 

\* 2610 

\* 2080 

Check shape for com

when subjected to co

No to th Kip

| $M_{\mathfrak{D}}$ | 50 ksi  | A    | $Z_x$ |  | 1               | rx   | rv        | 1 y -   | 36 ksi  |
|--------------------|---------|------|-------|--|-----------------|------|-----------|---------|---------|
| p                  | $P_{y}$ | A    | Zx    | Shape  | $\frac{d}{t_w}$ | 'x   | <i>'y</i> | $M_p$   | $P_{y}$ |
| Cip-ft.            | Kip     | In.2 | In.3  |  |                 | In.  | In.       | Kip-ft. | Kip.    |
| 3260               | * 2690  | 53.7 | 781   | W 40 × 12 × 183                              | 60.0            | 15.7 | 2.50      | 2340    | * 1930  |
| 3240               | 3320    | 66.4 | 777   | WTM 30 × 10.5 × 226                          | 32.5            | 12.6 | 2.38      | 2330    | 239     |
| 3210               | * 2950  | 59.1 | 772   | W 33 × 15.75 × 201                           | 47.1            | 14.0 | 3.56      | 2310    | * 213   |
| 3200               | 3460    | 69.1 | 769   | WTM 27 × 14 × 235                            | 31.5            | 11.8 | 3.33      | 2310    | 249     |
| 3190               | * 2850  | 57.0 | 767   | W 36×12 ×194                                 | 47.7            | 14.6 | 2.56      | 2300    | * 205   |
|                    | * 2990  | 59.8 | 764   | WTM 33 × 11.5 × 204                          | 42.3            | 13.8 | 2.54      | 2290    | 215     |
| 3180<br>3170       | 3870    | 77.5 | 760   | WTM 24 × 9 × 264                             | 20.4            | 10.6 | 2.22      | 2280    | 279     |
|                    | 4580    | 91.5 | 753   | WTM 18 × 11 × 311                            | 14.7            | 8.72 | 2.95      | 2260    | 329     |
| 3140               |         | 62.0 | 749   | W 30×15 ×211                                 | 39.9            | 12.9 | 3.49      | 2250    | 223     |
| 3120               | * 3100  |      | 749   | WTM 24 × 12.75 × 250                         | 25.3            | 10.7 | 3.14      | 2230    | 265     |
| 3100               | 3680    | 73.5 |       | WTM 24 × 12.75 × 250<br>WTM 21 × 12.25 × 275 | 19.8            | 9.71 | 3.12      | 2220    | 291     |
| 3090               | 4040    | 80.8 | 741   |  |                 |      | 4.29      | 2190    | 389     |
| 3040               | 5400    | 108  | 729   | W 14×16 ×370                                 | 10.8            | 7.10 |           |         | 255     |
| 3020               | 3540    | 70.9 | 724   | WTM 26 × 12 × 241                            | 25.9            | 10.9 | 2.82      | 2170    |         |
| 2990               | 3330    | 66.5 | 718   | WTM 28 × 12 × 226                            | 29.7            | 11.5 | 2.74      | 2160    | 240     |
| 2990               | * 2680  | 53.6 | 718   | W 36 × 12 × 182                              | 50.1            | 14.5 | 2.55      | 2150    | * 193   |
| 2980               | 3720    | 74.4 | 715   | WTM 24 × 12 × 253                            | 22.6            | 10.2 | 2.89      | 2140    | 268     |
| 2960               | 3950    | 78.9 | 710   | WTM 22 × 12 × 269                            | 19.5            | 9.53 | 2.96      | 2130    | 284     |
| 2950               | 3190    | 63.8 | 708   | WTM 27 × 14 × 217                            | 34.3            | 11.8 | 3.32      | 2120    | 230     |
| 2940               | 3040    | 60.7 | 705   | WTM 30 × 10.5 × 207                          | 34.7            | 12.5 | 2.35      | 2110    | 219     |
| 2910               | * 2750  | 55.0 | 699   | WTM 33 × 11.5 × 187                          | 45.4            | 13.7 | 2.52      | 2100    | * 198   |
| 2900               | 3240    | 64.8 | 695   | WTM 27 × 10 × 221                            | 28.6            | 11.5 | 2.33      | 2080    | 233     |
| 2880               | * 2450  | 49.1 | 692   | W 40 × 12 × 167                              | 59.4            | 15.3 | 2.40      | 2080    | * 177   |
| 2850               | 3510    | 70.3 | 685   | WTM 24 × 9 × 239                             | 22.1            | 10.5 | 2.18      | 2050    | 253     |
| 2820               | 4160    | 83.2 | 676   | WTM 18 × 11 × 283                            | 15.6            | 8.61 | 2.91      | 2030    | 299     |
| 2810               | 3360    | 67.2 | 676   | WTM 24 × 12.75 × 229                         | 27.1            | 10.7 | 3.11      | 2030    | 242     |
| 2800               | * 2810  | 56.1 | 673   | W 30×15 ×191                                 | 43.2            | 12.8 | 3.46      | 2020    | * 202   |
| 2780               | * 2500  | 50.0 | 668   | W 36×12 ×170                                 | 53.2            | 14.5 | 2.53      | 2010    | * 180   |
| 2780               | 5000    | 100  | 667   | W - 14×16 ×342                               | 11.4            | 7.00 | 4.25      | 2000    | 360     |
| 2760               | 3640    | 72.8 | 663   | WTM 21 × 12.25 × 248                         | 21.6            | 9.63 | 3.09      | 1990    | 262     |
| 2740               | 3240    | 64.9 | 658   | WTM 26 × 12 × 221                            | 27.7            | 10.8 | 2.79      | 1970    | 234     |
| 2670               | 3590    | 71.9 | 640   | WTM 22 × 12 × 245                            | 20.9            | 9.44 | 2.93      | 1920    | 259     |
| 2660               | 3350    | 67.0 | 638   | WTM 24 × 12 × 228                            | 24,4            | 10.1 | 2.85      | 1910    | 241     |
| 2630               | 2960    | 59.2 | 630   | WTM 27 × 10 × 201                            | 30.7            | 11.5 | 2.30      | 1890    | 213     |
| 2620               | * 2720  | 54.3 | 629   | WTM 30 × 10.5 × 185                          | 38.5            | 12.5 | 2.33      | 1890    | 196     |
| 2620               | * 2480  | 49.5 | 629   | WTM 33 × 11.5 × 169                          | 50.5            | 13.7 | 2.50      | 1890    | * 178   |
| 2620               | * 2850  | 57.0 | 628   | WTM 27 × 14 × 194                            | 37.5            | 11.7 | 3.29      | 1890    | 205     |
| 2600               | * 2350  | 47.0 | 624   | W 36×12 ×160                                 | 55.4            | 14.4 | 2.50      | 1870    | * 169   |
| 2580               | 3470    | 69.4 | 620   | WTM 22 × 8.5 × 236                           | 19.2            | 9.61 | 2.05      | 1860    | 250     |
| 2570               | 3200    | 64.0 | 618   | WTM 24 × 9 × 218                             | 23.7            | 10.4 | 2.15      | 1850    | 230     |
| 2540               | 3790    | 75.9 | 611   | WTM 18 × 11 × 258                            | 16.8            | 8.53 | 2.88      | 1830    | 273     |
| 2530               | 3040    | 60.7 | 606   | WTM 24 × 12.75 × 207                         | 29.6            | 10.6 | 3.08      | 1820    | 219     |
| -                  | _       | 50.8 | 605   | W 30 × 15 × 173                              | 46.5            | 12.7 | 3.43      | 1820    | * 183   |
| 2510               | 4570    | 91.4 | 603   | W 14×16 ×311                                 | 12.1            | 6.88 | 4.20      | 1810    | 329     |
| 2510               | 4940    | 98.8 | 603   | W 12×12 ×336                                 | 9.5             | 6.41 | 3.47      | 1810    | 356     |

<sup>\*</sup> Check shape for compliance with Formulas (2.7-1 a) or (2.7-1 b), Sect. 2.7, AISC Specification, as applicable when subjected to combined axial force and bending moment at ultimate loading.



# PLASTIC DESIGN SELECTION TABLE For W and WTM shapes

 $Z_{x}$ 

| _    |         |        |              |              |              |            | TOT VV and VV IIVI                      | Silapes         |              |                     |              | ^       |
|------|---------|--------|--------------|--------------|--------------|------------|---|-----------------|--------------|---------------------|--------------|---------|
| Ty   |         | 36 ksi | $F_y =$      | 50 ksi       | A            | 7          |   | ,               |              |                     | $F_y =$      | 36 ksi  |
|      | $M_p$   | $P_y$  | $M_p$        | $P_{y}$      | A            | $Z_x$      | Shape                                   | $\frac{d}{t_w}$ | rx           | ry                  | $M_p$        | $P_{y}$ |
| In.  | Kip-ft. | Kip.   | Kip-ft.      | Kip          | In.2         | In.3       |   | w               | In.          | ln.                 | Kip-ft.      | Kip.    |
| 2.50 | 2340    | * 1930 | _            | _            | 43.8         | 597        | W 40×12 ×149                            | 60.6            | 14.9         | 2.29                | 1790         | * 1580  |
| 2.38 | 2330    | 2390   | 2450         | 3270         | 65.4         | 589        | WTM 21 × 12.25 × 223                    | 23.4            | 9.54         | 3.05                | 1770         | 2350    |
| 1.56 | 2310    | * 2130 | 2420         | 3280         | 65.7         | 582        | WTM 22 × 12 × 223                       | 22.6            | 9.38         | 2.91                | 1740         | 2360    |
| .33  | 2310    | 2490   | 2420         | * 2210       | 44.2         | 581        | W 36×12 ×150                            | 57.4            | 14.3         | 2.47                | 1740         | * 1590  |
| .56  | 2300    | * 2050 | 2400         | 3050         | 60.9         | 576        | WTM 24 × 12 × 207                       | 26.5            | 10.0         | 2.82                | 1730         | 2190    |
| .54  | 2290    | 2150   | 2360         | * 2610       | 52.3         | 567        | W 27 × 14 × 178                         | 38.4            | 11.6         | 3.26                | 1700         | 1880    |
| 22   | 2280    | 2790   | 2360         | 2670         | 53.5         | 567        | WTM 27 × 10 × 182                       | 33.5            | 11.4         | 2.28                | 1700         | 1920    |
| .95  | 2260    | 3290   | 2340         | 3180         | 63.5         | 562        | WTM 22 × 8.5 × 216                      | 20.5            | 9.52         | 2.02                | 1690         | 2290    |
| 49   | 2250    | 2230   | 2330         | 2910         | 58.3         | 560        | WTM.24 × 9 × 198                        | 25.7            | 10.3         | 2.13                | 1680         | 2100    |
| .14  | 2230    | 2650   | 2330         | 2820         | 56.3         | 559        | WTM 24 × 12.75 × 192                    | 31.4            | 10.5         | 3.07                | 1680         | 2030    |
| .12  | 2220    | 2910   | 2330         | * 2240       | 44.7         | 559        | W 33 × 11.5 × 152                       | 52.7            | 13.5         | 2.47                | 1680         | * 1610  |
| 29   | 2190    | 3890   | 2320         | * 2420       | 48.5         | 558        | WTM 30 × 10.5 × 165                     | 42.3            | 12.4         | 2.30                | 1670         | 1740    |
| 82   | 2170    | 2550   | 2290         | 3440         | 68.8         | 549        | WTM 18 × 11 × 234                       | 18.2            | 8.44         | 2.85                | 1650         | 2480    |
| .74  | 2160    | 2400   | 2260         | 4160         | 83.3         | 542        | W 14×16 ×283                            | 13.0            | 6.79         | 4.17                | 1630         | 3000    |
|      |         |        | 2240         | 4480         | 89.6         | 537        | W 12 × 12 × 305                         | 10.0            | 6.29         | 3.42                | 1610         | 3230    |
| .55  | 2150    | * 1930 | 2210         | 2960         | 59.2         | 530        | WTM 21 × 12.25 × 201                    | 25.3            | 9.47         | 3.02                | 1590         | 2130    |
| .89  | 2140    | 2680   | 2200         | 3000         | 60.0         | 527        | WTM 22 × 12 × 204                       | 24.2            | 9.31         | 2.88                | 1580         | 2160    |
| .96  | 2130    | 2840   | 2160         | 2770         | 55.3         | 519        | WTM 24 × 12 × 188                       | 28.6            | 9.97         | 2.80                | 1560         | 1990    |
| .32  | 2120    | 2300   |              |              |              |            | 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1   |                 | 378          |                     |              |         |
| 35   | 2110    | 2190   | 2140         | * 2080       | 41.6         | 514        | W 33 × 11.5 × 141                       | 55.0            | 13.4         | 2.43                | 1540         | * 1500  |
| 52   | 2100    | * 1980 | 2130         | * 2370       | 47.4         | 512        | W 27×14 ×161                            | 41.8            | 11.5         | 3.24                | 1540         | 1710    |
| .33  | 2080    | 2330   | 2130         | 2580         | 51.7         | 511        | WTM 24 × 12.75 × 176                    | 33.7            | 10.5         | 3.04                | 1530         | 1860    |
| .40  | 2080    | * 1770 | -            | _            | 39.7         | 509        | W 36 × 12 × 135                         | 59.3            | 14.0         | 2.38                | 1530         | * 1430  |
| .18  | 2050    | 2530   | 2110         | 2660         | 53.2         | 507        | WTM 24 × 9 × 181                        | 27.6            | 10.3         | 2.10                | 1520         | 1910    |
| .91  | 2030    | 2990   | 2090         | 2850         | 57.1         | 501        | WTM 22 × 8.5 × 194                      | 22.4            | 9.45         | 1.99                | 1500         | 2050    |
| .11  | 2030    | 2420   | 2080         | * 2170       | 43.5         | 500        | WTM 30 × 10.5 × 148                     | 47.2            | 12.4         | 2.28                | 1500         | * 1570  |
| 46   | 2020    | * 2020 | 2040         | 3110         | 62.1         | 490        | WTM 18 × 11 × 211                       | 19.5            | 8.35         | 2.82                | 1470         | 2240    |
| .53  | 2010    | * 1800 | 2040         | * 2330       | 46.6         | 489        | WTM 27 × 10 × 159                       | 37.5            | 11.3         | 2.24                | 1470         | 1680    |
| .25  | 2000    | 3600   | 2030         | 3780         | 75.6         | 487        | W 14×16 ×257                            | 13.9            | 6.71         | 4.13                | 1460         | 2720    |
| 09   | 1990    | 2620   | 2010         | 4100         | 81.9         | 481        | W 12×12 ×279                            | 10.4            | 6.16         | 3.38                | 1440         | 2950    |
| 79   | 1970    | 2340   | 1980         | 2680         | 53.6         | 476        | WTM 21 × 12.25 × 182                    | 27.4            | 9.40         | 3.00                | 1430         | 1930    |
| 93   | 1920    | 2590   | 1950         | 2390         | 47.7         | 468        | W 24 × 12.75 × 162                      | 35.5            | 10.4         | 3.05                | 1400         | 1720    |
| .85  | 1910    | 2410   |              |              |              |            |   |                 | 40.0         | 0.00                | 4400         | * 1380  |
| 30   | 1890    | 2130   | 1940         | * 1920       | 38.3         | 467        | W 33 × 11.5 × 130                       | 57.1            | 13.2         | <b>2.39</b><br>3.21 | 1400<br>1380 | * 1550  |
| 33   | 1890    | 1960   | 1000         | -            | 42.9         | 461        | W 27 × 14 × 146                         | 45.3<br>23.9    | 11.4<br>9.37 | 1.96                | 1370         | 1880    |
| 50   | 1890    | * 1780 | 1900         | 2620         | 52.3         | 456        | WTM 22 × 8.5 × 178<br>WTM 24 × 9 × 163  | 30.2            | 10.2         | 2.08                | 1370         | 1730    |
| 29   | 1890    | 2050   | 1840         | 2400         | 48.0         | 455        |   | 21.2            | 8.28         | 2.00                | 1330         | 2030    |
|      |         |        |              | 2820         | 56.4         | 442        |   | 41.6            | 11.3         | 2.79                | 1320         | 1510    |
| 50   | 1870    | * 1690 | 1830         | * 2100       | 41.9         | 440        | WTM 27 × 10 × 143                       |                 | 12.2         | 2.25                | 1310         | * 1400  |
| 05   | 1860    | 2500   | 1820<br>1820 | * 1940       | 38.9         | 437        | W 30 × 10.5 × 132<br>W 14 × 16 × 233    | 49.3<br>15.0    | 6.63         | 4.10                | 1310         | 2460    |
| 15   | 1850    | 2300   | 1800         | 3420<br>2440 | 68.5<br>48.8 | 436<br>432 | W 14 × 16 × 233<br>WTM 21 × 12.25 × 166 | 30.0            | 9.36         | 2.98                | 1300         | 1760    |
| .88  | 1830    | 2730   | 1780         | 3700         | 74.1         |            | W 12 × 12 .25 × 166<br>W 12 × 12 × 252  | 11.0            | 6.06         | 3.34                | 1280         | 2670    |
| 08   | 1820    | 2190   | 1740         | * 2150       | 43.0         | 428<br>418 | W 12 × 12 × 252<br>W 24 × 12.75 × 146   | 38.1            | 10.3         | 3.01                | 1250         | 1550    |
| .43  | 1820    | * 1830 | 1740         | 2150         | 43.0         | 418        | VV 24 X 12.73 X 146                     | 30.1            | 10.5         | 3.01                | 1200         | 1550    |
| 20   | 1810    | 3290   |              |              | 1 1 1        |            |   |                 |              |                     |              |         |
| .20  | 1810    | 3560   |              |              | 14.7         |            |   |                 |              |                     |              |         |
| 41   |         |        |              |              |              |            |   |                 |              |                     | 1            |         |
|      |         |        |              |              |              |            |   |                 |              |                     |              |         |
|      |         |        |              |              |              |            |   |                 |              |                     |              |         |
|      |         | 1000   |              |              |              |            |   |                 |              |                     |              |         |

<sup>\*</sup> Check shape for compliance with Formulas (2.7-1 a) or (2.7-1 b), Sect. 2.7, AISC Specification, as applicable, when subjected to combined axial force and bending moment at ultimate loading.

Specification, as applicable

 $Z_{x}$ 

# PLASTIC DESIGN SELECTION TABLE For W and WTM shapes

| 3            | 50 ksi |                   | 7     |                      | ,               |                |      | ry =       | 36 ksi       |
|--------------|--------|-------------------|-------|----------------------|-----------------|----------------|------|------------|--------------|
| $M_p$        | Py     | A                 | $Z_x$ | Shape                | $\frac{d}{t_w}$ | r <sub>x</sub> | ry   | $M_p$      | $P_{y}$      |
| Kip-ft.      | Kip    | In.2              | In.3  |                      |                 | In.            | In.  | Kip-ft.    | Kip.         |
|              |        | 34.7              | 415   | W 33×11.5 ×118       | 59.7            | 13.0           | 2.32 | 1240       | * 125        |
| 1710         | 2370   | 47.4              | 410   | WTM 22 × 8.5 × 161   | 25.9            | 9.31           | 1.93 | 1230       | 171          |
| 1700         | * 1820 | 36.5              | 408   | W 30 × 10.5 × 124    | 51.6            | 12.1           | 2.23 | 1220       |              |
| 1690         | 2150   | 43.0              | 405   | WTM 24 × 9 × 146     | 32.9            | 10.1           | 2.05 | 1210       | * 131<br>155 |
|              | 2570   |                   | 398   | WTM 18 × 11 × 175    | 22.5            |                | 2.76 | 1190       | 185          |
| 1660         |        | 51.3<br>37.8      | 395   | WTM 27 × 10 × 129    | 45.3            | 8.20           |      |            |              |
| 1640<br>1620 | * 1890 | 62.0              | 390   | W 14×16 ×211         |                 |                | 2.21 | 1180       | * 136        |
|              | 3100   | The second second | 386   |                      | 16.0            | 6.55           | 4.07 | 1170       | 223          |
| 1610         | 3390   | 67.7              | 300   | W 12×12 ×230         | 11.7            | 5.97           | 3.31 | 1160       | 244          |
| 1580         | * 1710 | 34.2              | 378   | W 30 × 10.5 × 116    | 53.1            | 12.0           | 2.19 | 1140       | * 123        |
| 1550         | 2160   | 43.2              | 373   | W 21 × 12.25 × 147   | 30.6            | 9.17           | 2.95 | 1120       | 156          |
| 1540         | * 1930 | 38.5              | 370   | W 24 × 12.75 × 131   | 40.5            | 10.2           | 2.97 | 1110       | 139          |
| 1540         | 2150   | 42.9              | 369   | WTM 22 × 8.5 × 146   | 28.0            | 9.23           | 1.90 | 1110       | 15           |
| 1480         | 2320   | 46.3              | 356   | WTM 18 × 11 × 158    | 24.3            | 8.12           | 2.74 | 1070       | 167          |
| 1480         | 2840   | 56.8              | 355   | W 14×16 ×193         | 17.4            | 6.50           | 4.05 | 1060       | 204          |
| 1470         | * 1880 | 37.6              | 352   | WTM 24 × 9 × 128     | 37.3            | 10.1           | 2.03 | 1060       | 13           |
| 1450         | 3090   | 61.8              | 348   | W 12×12 ×210         | 12.5            | 5.89           | 3.28 | 1040       | 222          |
| 1440         | * 1590 | 31.7              | 346   | W 30 × 10.5 × 108    | 54.7            | 11.9           | 2.15 | 1040       | * 114        |
| 1430         | * 1680 | 33.5              | 343   | W 27 × 10 × 114      | 47.9            | 11.0           | 2.18 | 1030       | * 12         |
| 1390         | 1950   | 39.1              | 335   | WTM 22 × 8.5 × 133   | 30.7            | 9.20           | 1.89 | 1000       | 14           |
| 1390         | 1940   | 38.8              | 333   | W 21 × 12.25 × 132   | 33.6            | 9.12           | 2.93 | 1000       | 140          |
| _            | _      | 34.4              | 327   | W 24 × 12.75 × 117   | 44.1            | 10.1           | 2.94 | 981        | * 124        |
| 1340         | 2100   | 42.1              | 322   | WTM 18 × 11 × 143    | 26.7            | 8.09           | 2.72 | 966        | 15           |
| 1330         | 2590   | 51.8              | 320   | W 14×16 ×176         | 18.3            | 6.43           | 4.02 | 960        | 186          |
| 1320         | * 1690 | 33.9              | 316   | WTM 24 × 9 × 115     | 40.6            | 10.0           | 2.01 | 947        | 122          |
| _            | _      | 29.1              | 312   | W 30 × 10.5 × 99     | 57.0            | 11.7           | 2.10 | 937        | * 105        |
| 1300         | 2790   | 55.8              | 311   | W 12×12 ×190         | 13.6            | 5.82           | 3.25 | 933        | 201          |
| 1280         | 1790   | 35.9              | 307   | W . 21 × 12.25 × 122 | 36.1            | 9.09           | 2.92 | 921        | 129          |
| 1270         | * 1500 | 30.0              | 305   | W 27 × 10 × 102      | 52.6            | 11.0           | 2.15 | 916        | * 108        |
| 1220         | 1730   | 34.5              | 293   | WTM 22 × 8.5 × 118   | 33.9            | 9.13           | 1.86 | 880        |              |
| 1210         | 1910   | 38.2              | 290   | WTM 18 × 11 × 130    | 28.7            | 8.03           |      |            | 124          |
| -            | -      | 30.6              | 289   | W 24 × 12.75 × 104   | 48.1            |                | 2.70 | 871        | 138          |
| 1200         | 2340   | 46.7              | 287   | W 14 × 16 × 159      | 20.1            | 10.1           | 2.91 | 867        | * 110        |
| 1170         | * 1510 | 30.3              | 280   | WTM 24 × 9 × 103     | 44.6            | 6.38<br>9.96   | 4.00 | 861        | 168          |
| -            | -      | 32.7              | 279   | W 21 × 12.25 × 111   | 39.1            | 9.96           | 2.90 | 840<br>836 | * 109        |
| 1160         | * 1200 | 27.7              | 070   | W 0769               |                 | 10.7           |      | 1000       |              |
| 1140         | * 1380 | 27.7              | 278   | W 27 × 10 × 94       | 54.9            | 10.9           | 2.12 | 834        | * 99         |
| 1090         | 2500   | 50.0              | 275   | W 12×12 ×170         | 14.6            | 5.74           | 3.22 | 824        | 180          |
| 1090         | 1750   | 35.1              | 261   | W 18×11 ×119         | 29.0            | 7.90           | 2.69 | 784        | 126          |
| 1060         | * 1200 | 42.7              | 260   | W 14×16 ×145         | 21.7            | 6.33           | 3.98 | 781        | 154          |
|              | * 1380 | 27.7              | 254   | W 24 × 9 × 94        | 47.2            | 9.87           | 1.98 | 761        | * 99         |
|              |        | 29.8              | 253   | W 21 × 12.25 × 101   | 42.7            | 9.02           | 2.89 | 759        | 107          |
| -            | -      | 24.8              | 244   | W 27×10 × 84         | 58.1            | 10.7           | 2.07 | 733        | * 89         |
| 1010         | 2240   | . 44.7            | 243   | W 12 × 12 × 152      | 15.8            | 5.66           | 3.19 | 728        | 161          |
|              | -      | 38.8              | 234   | W 14 × 14.5 × 132    | 22.7            | 6.28           | 3.76 | 703        | 140          |
| 960          | 1560   | 31.1              | 230   | W 18×11 ×106         | 31.7            | 7.84           | 2.66 | 691        | 112          |

Check shape for compliance with Formulas (2.7-1 a) or (2.7-1 b), Sect. 2.7, AISC Specification, as applicable when subjected to combined axial force and bending moment at ultimate loading.



= 50 ksi

(p-lt Kip 834 \* 1240 820 \* 1370 890 2000

879 1430 835 \* 1120

825 1470 817 \* 1220 - - - 1760

692 1560

\* 1000

913 578 1200

955 \* 955

481 \* 738 48 \* 838



# PLASTIC DESIGN SELECTION TABLE For W and WTM shapes

 $\mathbf{Z}_{\mathsf{x}}$ 

| ry   | $F_y =$      | 36 ksi |         | 501-1  |      |         |  |                  |      |       | _       |         |
|------|--------------|--------|---------|--------|------|---------|--|------------------|------|-------|---------|---------|
| ,    | $M_p$        | Py     | -       | 50 ksi | A    | $Z_{x}$ | Ohana  | d                | rx   | $r_y$ | -       | 36 ksi  |
| ln.  | Kip-ft.      | Kip.   | $M_p$   | $P_y$  |      |         | Shape  | $\overline{t}_w$ |      |       | $M_p$   | $P_{y}$ |
|      |              | KIP.   | Kip-ft. | Kip    | In.2 | In.3    |  |                  | In.  | In.   | Kip-ft. | Kip.    |
| 1.93 | 1240<br>1230 | * 1250 | 934     | * 1240 | 24.7 | 224     | W 24 × 9 × 84  | 51.3             | 9.79 | 1.95  | 673     | * 890   |
| 2.23 | 1230         | 1710   | 920     | * 1370 | 27.3 | 221     | W 21 × 8.25 × 93   | 37.3             | 8.70 | 1.84  | 662     | 984     |
| 2.05 |              | * 1310 | 890     | 2000   | 39.9 | 214     | W 12 × 12 × 136  | 17.0             | 5.58 | 3.16  | 641     | 1440    |
| 2.76 | 1210         | 1550   | _       |        | 35.3 | 212     | W 14 × 14.5 × 120  | 24.5             | 6.24 | 3.74  | 636     | 1270    |
| 2.21 | 1190         | 1850   | 879     | 1430   | 28.5 | 211     | W 18 × 11 × 97   | 34.7             | 7.82 | 2.65  | 633     | 1030    |
| 4.07 | 1180         | * 1360 |         |        |      |         |  |                  |      |       |         |         |
| 3.31 | 1170         | 2230   | 835     | * 1120 | 22.4 | 200     | W 24 × 9 × 76  | 54.4             | 9.69 | 1.92  | 601     | * 805   |
| 0.01 | 1160         | 2440   | 825     | 1470   | 29.4 | 198     | W 16 × 10.25 × 100   | 29.0             | 7.10 | 2.51  | 594     | 1060    |
| 2.19 | 1110         |        | 817     | * 1220 | 24.3 | 196     | W 21 × 8.25 × 83   | 41.6             | 8.67 | 1.83  | 588     | 876     |
| 2.95 | 1140         | * 1230 | _       | _      | 32.0 | 192     | W 14 × 14.5 × 109  | 27.3             | 6.22 | 3.73  | 575     | 1150    |
| 2.97 | 1120         | 1560   | 776     | 1760   | 35.3 | 186     | W 12 × 12 × 120  | 18.5             | 5.51 | 3.13  | 559     | 1270    |
| 1.90 | 1110         | 1390   | -       | _      | 25.3 | 186     | W 18 × 11 × 86   | 38.3             | 7.77 | 2.63  | 557     | 911     |
| 2.74 | 1110         | 1550   |         | 100    |      |         |  |                  |      |       |         |         |
| 4.05 | 1070         | 1670   | -       | _      | 20.1 | 177     | W 24 × 9 × 68  | 57.2             | 9.55 | 1.87  | 530     | * 722   |
|      | 1060         | 2040   | 727     | 1310   | 26.2 | 175     | W 16 × 10.25 × 89  | 31.9             | 7.05 | 2.49  | 524     | 941     |
| 2.03 | 1060         | 1350   | 718     | * 1070 | 21.5 | 172     | W 21 × 8.25 × 73   | 46.7             | 8.64 | 1.81  | 517     | * 773   |
| 3.28 | 1040         | 2220   | 682     | 1560   | 31.2 | 164     | W 12 × 12 × 106  | 21.1             | 5.47 | 3.11  | 491     | 1120    |
| 0.45 | 1010         |        | -       | -      | 22.3 | 163     | W 18 × 11 × 76   | 42.8             | 7.73 | 2.61  | 489     | * 803   |
| 2.15 | 1040         | * 1140 |         | 7 905  |      |         | The state of the s |                  |      |       |         |         |
| 2.18 | 1030         | * 1210 | 666     | * 1000 | 20.0 | 160     | W 21 × 8.25 × 68   | 49.1             | 8.60 | 1.80  | 480     | * 721   |
| 1.89 | 1000         | 1410   |         | 200    | 1333 |         | 100000000000000000000000000000000000000  |                  |      |       |         |         |
| 2.93 | 1000         | 1400   | 648     | * 921  | 18.4 | 156     | W 24 × 7 × 62  | 55.2             | 9.25 | 1.37  | 467     | * 663   |
| 2.94 | 981          | * 1240 | 625     | 1130   | 22.6 | 150     | W 16 × 10.25 × 77  | 36.3             | 7.00 | 2.47  | 450     | 814     |
| 2.72 | 966          | 1510   | 614     | 1650   | 32.9 | 147     | W 10 × 10 × 112  | 15.0             | 4.66 | 2.68  | 442     | 1190    |
| 4.02 | 960          | 1860   | 614     | 1410   | 28.2 | 147     | W 12 × 12 × 96   | 23.1             | 5.44 | 3.09  | 442     | 1020    |
| 2.01 | 947          | 1220   | 606     | * 1040 | 20.8 | 145     | W 18 × 7.5 × 71  | 37.3             | 7.50 | 1.70  | 436     | 750     |
| 2.10 | 937          | * 1050 | 602     | * 913  | 18.3 | 144     | W 21 × 8.25 × 62   | 52.5             | 8.54 | 1.77  | 433     | * 657   |
| 3.25 | 933          | 2010   | 578     | 1200   | 24.1 | 139     | W 14 × 10 × 82   | 28.1             | 6.05 | 2.48  | 416     | 866     |
| 2.92 | 921          | 1290   |         |        |      | 10.2    | TOTAL TOTAL STATE  |                  |      |       |         |         |
| 2.15 | 916          | * 1080 | 569     | * 820  | 16.4 | 137     | W 24 × 7 × 55  | 59.7             | 9.14 | 1.33  | 410     | * 591   |
| 1.86 | 880          | 1240   | 555     | * 955  | 19.1 | 133     | W 18 × 7.5 × 65  | 40.8             | 7.49 | 1.69  | 400     | 688     |
| 2.70 | 871          | 1380   | _       | _      | 25.6 | 132     | W 12 × 12 × 87   | 24.3             | 5.38 | 3.07  | 396     | 921     |
| 2.91 | 867          | * 1100 | -       | _      | 19.7 | 130     | W 16 × 10.25 × 67  | 41.3             | 6.96 | 2.46  | 390     | 708     |
| 4.00 | 861          | 1680   | 541     | 1470   | 29.4 | 130     | W 10 × 10 × 100  | 16.3             | 4.60 | 2.65  | 390     | 1060    |
| 1.99 | 840          | * 1090 | 538     | * 839  | 16.8 | 129     | W 21 × 6.5 × 57  | 52.0             | 8.36 | 1.35  | 387     | * 604   |
| 2.90 | 836          | 1180   | 523     | 1090   | 21.8 | 126     | W 14 × 10 × 74   | 31.5             | 6.04 | 2.48  | 377     | 784     |
| 2.00 |              |        | 511     | * 882  | 17.6 | 123     | W 18 × 7.5 × 60  | 44.0             | 7.47 | 1.69  | 368     | * 635   |
| 2.12 | 834          | * 996  | -       |        | 23.2 | 119     | W 12 × 12 × 79   | 26.3             | 5.34 | 3.05  | 357     | 835     |
| 3.22 | 824          | 1800   | 478     | 999    | 20.0 | 115     | W 14 × 10 × 68   | 33.8             | 6.01 | 2.46  | 344     | 720     |
| 2.69 | 784          | 1260   | 470     | 1290   | 25.9 | 113     | W 10 × 10 × 88   | 17.9             | 4.54 | 2.63  | 339     | 932     |
| 3.98 | 781          | 1540   |         |        | 1000 |         | 38 3 22 2  |                  |      |       |         |         |
|      | 761          | * 997  | 466     | * 810  | 16.2 | 112     | W 18 × 7.5 × 55  | 46.4             | 7.41 | 1.67  | 335     | * 583   |
| 1.98 | 759          | 1070   |         |        |      |         |  |                  |      |       |         |         |
| 2.00 |              |        | 461     | * 738  | 14.8 | 111     | W 21 × 6.5 × 50  | 54.8             | 8.19 | 1.30  | 332     | * 531   |
| 2.07 | 733          | * 891  | 438     | * 838  | 16.8 | 105     | W 16 × 7 × 57  | 38.2             | 6.72 | 1.60  | 316     | 604     |
|      | 728          | 1610   | -       | -      | 17.9 | 102     | W 14×10 × 61   | 37.0             | 5.98 | 2.45  | 307     | 645     |
| 3.19 | 703          | 1400   |         |        |      |         |  |                  |      |       |         |         |
|      | 691          | 1120   |         |        |      |         |  |                  |      |       |         |         |
| 2.66 |              |        | No.     |        |      |         |  |                  |      |       | -       |         |
|      |              |        |         |        |      |         |  |                  |      |       |         |         |

Check shape for compliance with Formulas (2.7-1 a) or (2.7-1 b), Sect. 2.7, AISC Specification, as applicable, when subjected to combined axial force and bending moment at ultimate loading.

Specification, as applicable.

 $Z_{x}$ 

# PLASTIC DESIGN SELECTION TABLE For W and WTM shapes

| ry =    | = 50 ksi |       | 7     |                   | ,               | -              | -    | $r_y =$ | 36 ksi  |
|---------|----------|-------|-------|-------------------|-----------------|----------------|------|---------|---------|
| $M_p$   | $P_{y}$  | A     | $Z_x$ | Shape             | $\frac{d}{t_w}$ | r <sub>x</sub> | ry   | $M_p$   | $P_{y}$ |
| Kip-ft. | Kip      | ln.2  | In.3  |                   |                 | In.            | In.  | Kip-ft. | Kip     |
| 420     | * 733    | 14.7  | 101   | W 18 × 7.5 × 50   | 50.7            | 7.38           | 1.65 | 302     | * 5     |
| 407     | 1130     | 22.6  | 97.6  | W 10 × 10 × 77    | 20.0            | 4.49           | 2.60 | 293     | 8       |
| _       | _        | 13.0  | 95.8  | W 21 × 6.5 × 44   | 59.0            | 8.06           | 1.26 | 287     | * 4     |
| 383     | * 737    | 14.7  | 92.0  | W 16 × 7 × 50     | 42.8            | 6.68           | 1.59 | 276     | 5       |
| 379     | * 678    | 13.6  | 90.9  | **W 18 × 6 × 46   | 50.2            | 7.25           | 1.29 | 273     | * 4     |
| 363     | * 781    | 15.6  | 87.1  | **W 14 × 8 × 53   | 37.6            | 5.89           | 1.92 | 261     | 5       |
| _       |          | 17.0  | 86.4  | W 12×10 ×58       | 33.9            | 5.28           | 2.51 | 259     | 6       |
| 355     | 999      | 20.0  | 85.3  | W 10 × 10 × 68    | 22.1            | 4.44           | 2.59 | 256     | 7       |
| 343     | * 663    | 13.3  | 82.3  | W 16 × 7 × 45     | 46.8            | 6.65           | 1.57 | 247     | * 4     |
| 327     | * 589    | 11.8  | 78.5  | **W 18 × 6 × 40   | 56.8            | 7.22           | 1.27 | 236     | * 4     |
| 327     | * 707    | 14.1  | 78.4  | **W 14 × 8 × 48   | 40.6            | 5.85           | 1.91 | 235     | 5       |
| -       | _        | 17.6  | 74.6  | W 10 × 10 × 60    | 24.3            | 4.39           | 2.57 | 224     | 6       |
| 304     | * 589    | 11.8  | 72.9  | W 16 × 7 × 40     | 52.5            | 6.63           | 1.57 | 219     | * 4     |
| 302     | 734      | 14.7  | 72.4  | **W 12 × 8 × 50   | 32.9            | 5.18           | 1.96 | 217     | 5       |
| 292     | 984      | 19.7  | 70.2  | W 8 × 8 × 67      | 15.8            | 3.72           | 2.12 | 210     | 7       |
| -       | -        | 12.6  | 69.6  | **W 14 × 8 × 43   | 44.8            | 5.82           | 1.89 | 209     | * 4     |
| _       | _        | 10.3  | 66.7  | **W 18 × 6 × 35   | 59.0            | 7.04           | 1.22 | 200     | * 3     |
|         | -        | 15.8  | 66.6  | W 10 × 10 × 54    | 27.3            | 4.37           | 2.56 | 200     | 5       |
| 270     | 661      | 13.2  | 64.7  | **W 12 × 8 × 45   | 36.0            | 5.15           | 1.94 | 194     | 4       |
| _       | _        | 10.6  | 64.0  | W 16 × 7 × 36     | 53.8            | 6.51           | 1.52 | 192     | * 3     |
| 256     | * 558    | 11.2  | 61.5  | W 14 × 6.75 × 38  | 45.5            | 5.87           | 1.55 | 184     | * 4     |
| 249     | 855      | 17.1  | 59.8  | W 8 × 8 × 58      | 17.2            | 3.65           | 2.10 | 179     | 6       |
| -       | _        | 11.8  | 57.5  | **W 12 × 8 × 40   | 40.5            | 5.13           | 1.94 | 173     | 4       |
| 229     | 663      | 13.3  | 54.9  | W 10 × 8 × 45     | 28.9            | 4.32           | 2.01 | 165     | 4       |
| -       | -        | 10.0- | 54.6  | W 14 × 6.75 × 34  | 49.1            | 5.83           | 1.53 | 164     | * 3     |
| 226     | * 457    | 9.1   | 54.2  | **W 16 × 5.5 × 31 | 57.7            | 6.41           | 1.16 | 163     | * 3     |
| 213     | * 517    | 10.3  | 51.2  | W 12 × 6.5 × 35   | 41.7            | 5.25           | 1.54 | 153     | 3       |
| 204     | 705      | 14.1  | 49.0  | W 8 × 8 × 48      | 21.3            | 3.61           | 2.08 | 147     | 5       |
| -       | -        | 11.5  | 46.8  | W 10 × 8 × 39     | 31.5            | 4.27           | 1.98 | 141     | 4       |
| _       | -        | 7.7   | 44.4  | **W 16 × 5.5 × 26 | 62.8            | 6.27           | 1.12 | 133     | * 2     |
|         | -        | 8.7   | 43.1  | W 12 × 6.5 × 30   | 47.5            | 5.21           | 1.52 | 129     | * 3     |
| 168     | * 386    | 7.7   | 40.4  | **W 14 × 5 × 26   | 54.5            | 5.65           | 1.07 | 121     | * 2     |
|         | -        | 11.7  | 39.8  | W 8 × 8 × 40      | 22.9            | 3.53           | 2.04 | 119     | 4       |
| 152     | 442      | 8.8   | 36.6  | W 10 × 5.75 × 30  | 34.9            | 4.38           | 1.37 | 110     | 3       |
|         |          | 10.3  | 34.7  | W 8× 8 ×35        | 26.2            | 3.51           | 2.03 | 104     | 3       |
|         |          |       |       |                   |                 |                |      |         |         |
|         |          |       |       |                   |                 |                |      |         |         |
|         |          |       |       |                   |                 |                |      |         |         |

<sup>\*</sup> Check shape for compliance with Formulas (2.7-1 a) or (2.7-1 b), Sect. 2.7, AISC Specification, as applicable, when subjected to combined axial force and bending moment at ultimate loading.

Check shape for co ble, when subjected Presently not availab

E = 50 ksi

Kip

130 \* 381

103 \* 279

\* 281

367 \* 250

57 222 49 237 48 278



<sup>\*\*</sup> Presently not available in our rolling program.

# PLASTIC DESIGN SELECTION TABLE For W and WTM shapes

 $Z_{x}$ 

| 7,   | E a   |                     |  |   |                |                     |                                     |                  |                     |                     |           |                  |
|--|---|---------------------|--|---|----------------|---------------------|-------------------------------------|------------------|---------------------|---------------------|-----------|------------------|
|  |   | 6 ksi               | $F_y =$                                      | 50 ksi  | A              | 7                   | 4                                   | ,                |                     |                     | $F_y =$   | 36 ksi           |
|  | Mp  | Py                  | Mp   | $P_{\gamma}$  | A              | $Z_x$               | Shape                               | $\frac{d}{t_w}$  | rx                  | ry                  | $M_p$     | $P_{\gamma}$     |
| In. K  | Kip-ft.   | Kip.                | Kip-ft.                                      | Kip   | In.2           | In.3                |                                     | w                | In.                 | In.                 | Kip-ft.   | Kip.             |
|  | <b>302</b> 293  | * <b>528</b><br>815 | 130  | -<br>* 381  | <b>6.5</b> 7.6 | <b>33.3</b><br>31.3 | **W 14 × 5 × 22<br>W 10 × 5.75 × 26 | <b>59.7</b> 39.7 | <b>5.54</b><br>4.35 | <b>1.04</b><br>1.36 | 100<br>94 | * <b>235</b> 274 |
| 1.26 1.59 1.29 1.92 2.51 2.59 1.57 1.27 1.91 2.57 1.57 1.69 2.12 1.89 1.22 | 288 287 276 273 261 279 256 247 276 235 224 219 217 210 209 200 200 194 192 184 163 165 164 163 129 121 119 110 10 10 10 10 10 10 10 10 10 10 10 10 |                     | 130 122 103 90 85 79 78 57 49 48 40 33 26 25 | * 381  * 324   * 279   * 281 308  367  * 250  222 237 278  235  239 202 190 |                |                     |                                     |                  |                     |                     |           |                  |

<sup>\*</sup> Check shape for compliance with Formulas (2.7-1 a) or (2.7-1 b), Sect. 2.7, AISC Specification, as applicable, when subjected to combined axial force and bending moment at ultimate loading.

ISC Specification, as applic

loading.

<sup>\*\*</sup> Presently not available in our rolling program.

 $I_{\mathsf{X}}$ 

# MOMENT OF INERTIA SELECTION TABLE For W and WTM shapes

| Shape                                    | $I_x$   | Shape  | $I_{x}$        | Shape                                    | $I_x$        |
|--|---------|--|----------------|--|--------------|
| Snape                                    | In.4    | Shape  | In.4           | Snape                                    | In.4         |
| WTM 36 × 16.5 × 848                      | 67400   | W 40×18 ×298                                 | 24200          | W 40×16 ×215                             | 1670         |
|  |         | WTM 33 × 11.5 × 398                          | 24000          | W 40×18 ×221                             | 1660         |
| WTM 36 × 16.5 × 798                      | 62600   | WTM 36 × 12 × 350                            | 23600          | WTM 26 × 12 × 427                        | 1650         |
| WTM 40 × 16 × 655                        | 56500   |  |                | WTM 32 × 12 × 313                        | 1610         |
| WTM 36 × 16.5 × 720                      | 55300   | WTM 40 × 16 × 297                            | 23200          | WTM 27 × 14 × 368                        | 1610         |
| UTT14 40 40 500                          | 50400   | WTM 30 × 15 × 433                            | 23200          | W 36 × 16.5 × 245                        | 1610         |
| WTM 40 × 16 × 593                        | 50400   | WTM 27 × 14 × 494                            | 22900          | WTM 30 × 10.5 × 323                      | 1590         |
| WTM 36 × 16.5 × 650                      | 48900   | WTM 30 × 10.5 × 435                          | 22500          | WTM 24 × 12 × 457                        | 1590         |
| WTM 40 × 12 × 561                        | 45300   | WTM 32 × 12 × 418                            | 22500          | WTM 33 × 15.75 × 263                     | 1580         |
| WTM 40 × 16 × 531                        | 44300   | WTM 36 × 16.5 × 328                          | 22500          | WTM 27 × 10 × 369                        | 1570         |
| WTM 36 × 16.5 × 588                      | 43500   |  |                | WTM 33 × 11.5 × 271                      | 1560         |
| WTM 33 × 15.75 × 619                     | 41800   | WTM 40 × 12 × 294                            | 21900          | W 40 × 12 × 211                          | 4556         |
|  |         |  |                | WTM 24 × 12.75 × 408                     | 1550         |
| WTM 40 × 12 × 520                        | 41500   | W 40 × 16 × 277                              | 21900          |  | 1510<br>1500 |
| WTM 36 × 12 × 548                        | 39600   | WTM 33 × 15.75 × 354                         | 21900          |  |              |
| WTM 40 × 16 × 480                        | 39500   | WTM 28 × 12 × 485                            | 21600          |  | 1500         |
| WTM 36 × 16.5 × 527                      | 38300   |  |                | WTM 36 × 12 × 232                        | 1500         |
| WTM 33 × 15.75 × 567                     | 37700   | W 40 × 18 × 268                              | 21500          | W 40×16 ×199                             | 1490         |
|  |         | WTM 33 × 11.5 × 361                          | 21400          | WTM 30 × 15 × 292                        | 1490         |
| WTM 40 x 12 x 475                        | 37300   | WTM 36 × 12 × 318                            | 21300          | WTM 26 × 12 × 387                        | 1470         |
| WTM 36 × 12 × 508                        | 36300   | WTM 30 × 15 × 391                            | 20700          | WTM 27 × 14 × 336                        | 1450         |
| WTM 40 × 16 × 436                        | 35400   | WTM 27 × 14 × 448                            | 20400          | WTM 32 × 12 × 286                        | 1450         |
| WTM 36 × 16.5 × 485                      | 34700   | W 36×16.5 ×300                               | 20300          | W 14×16 ×730                             | 1430         |
| WTM 40 × 12 × 437                        | 33900   | WTM 30 × 10.5 × 394                          | 20100          | WTM 30 × 10.5 × 295                      | 1430         |
| VTM 33 × 15.75 × 515                     | 33700   | WTM 32 × 12 × 380                            | 20000          | W 33 × 15.75 × 241                       | 1420         |
| WTM 30 x 15.75 x 515                     | 33000   | WTM 27 × 10 × 446                            | 19700          | WTM 24 × 12 × 414                        | 1400         |
| WTM 33 × 11.5 × 520                      | 32900   | WTM 33 × 15.75 × 318                         | 19500          | WTM 27 × 10 × 335                        | 1390         |
| VTM 36 × 12 × 464                        | 32600   | 144 40 40 040                                |                | WTM 33 × 11.5 × 243                      | 1380         |
| W 11 W 1 30 X 12 X 404                   | 32000   | W 40 × 16 × 249                              | 19500          |  |              |
| WTM 40 × 16 × 397                        | 32000   | WTM 33 × 11.5 × 332<br>WTM 40 × 12 × 264     | 19500          | W 40 × 18 × 192                          | 1350         |
| VTM 36 × 16.5 × 439                      | - 31000 | WTM 40 × 12 × 264                            | 19400          | WTM 24 × 12.75 × 370                     | 1340         |
| VTM 40 × 12 × 396                        | 30400   | W 40 × 18 × 244                              | 10000          | WTM 28 × 12 × 325                        | 1340         |
| VTM 33 × 15.75 × 468                     | 30100   | W 40 x 18 x 244<br>WTM 24 x 12.75 x 492      | 19200          | W 40 40 400                              |              |
| VTM 33 × 11.5 × 476                      | 29700   | WTM 28 × 12 · / 5 × 492<br>WTM 28 × 12 × 438 | 19100          | W 40 × 12 × 183                          | 1330         |
| VTM 36 × 12 × 426                        | 29500   | W 1M 28 × 12 × 438<br>W 36 × 16.5 × 280      | 19100          | W 36×12 ×210                             | 1320         |
| WTM 30 × 15 × 526                        | 29300   | 11 00 X 10.0 X 200                           | 18900          | WTM 27 × 14 × 307                        | 1310         |
| VTM 40 × 16 × 362                        |         |  | 18900          | WTM 30 × 15 × 261                        | 1310         |
|  | 28900   |  | 18700          | WTM 30 × 10.5 × 269                      | 1290         |
| WTM 32 × 12 × 511<br>WTM 36 × 16.5 × 393 | 28500   |  | 18600          | WTM 26 × 12 × 351                        | 1290         |
| 11W 30 X 10.5 X 393                      | 27500   | WTM 27 × 14 × 407<br>WTM 30 × 10.5 × 358     | 18100<br>17800 | W 33 × 15.75 × 221<br>WTM 32 × 12 × 256  | 1280         |
| WTM 40 x 12 x 359                        | 27200   | WTM 30 × 10.5 × 358<br>WTM 32 × 12 × 343     | 17800          | WTM 32 × 12 × 256<br>WTM 24 × 12 × 375   | 1280         |
| WTM 33 × 15.75 × 424                     | 26900   | WTM 32 x 12 x 343<br>WTM 33 x 15.75 x 291    | 17700          | WTM 24 × 12 × 3/5<br>WTM 24 × 9 × 354    | 1240         |
| V 40 × 18 × 328                          |         | WTM 27 × 10 × 407                            | 17700          | W 14×16 ×665                             | 1240         |
| TO A TO A DEO                            | 26800   | WTM 27 × 10 × 407<br>WTM 33 × 11.5 × 302     | 17500          | WTM 27 × 10 × 302                        | 1240         |
| VTM 33 × 11.5 × 432                      | 26500   | W11VI 33 X 11.5 X 302                        | 1/500          | WTM 27 × 10 × 302<br>WTM 33 × 11.5 × 219 |              |
| WTM 36 × 12 × 387                        | 26500   | W 40 × 12 × 235                              | 17400          | WTM 21 × 12.25 × 402                     | 1230<br>1220 |
| WTM 30 × 15 × 477                        | 26100   | W 36 × 16.5 × 260                            | 17300          |  | 1220         |
| VTM 40 × 16 × 324                        | 25600   | WTM 24 × 12.75 × 450                         | 17100          | W 40×16 ×174                             | 1210         |
| VTM 27 × 14 × 539                        | 25500   | WTM 28 × 12 × 397                            | 17000          | W 36×12 ×194                             | 1210         |
| VTM 32 × 12 × 462                        | 25300   | WTM 30 × 12 × 326                            | 16800          | WTM 28 × 12 × 296                        | 1200         |
| VTM 30 × 10.5 × 475                      | 25100   | WTM 36 × 12 × 256                            | 16800          | WTM 27 × 14 × 281                        | 1190         |
| VTM 36 × 16.5 × 359                      | 24800   |  |                | WTM 24 × 12.75 × 335                     | 1190         |
| VTM 40 × 12 × 327                        | 24500   |  |                | WTM 30 × 15 × 235                        | 1170         |
| VTM 33 × 15.75 × 387                     | 24300   |  |                | WTM 30 × 10.5 × 246                      | 1170         |

Shape

W 40×12 ×16 WTM 32 × 12 × 234 WTM 22 x 12 × 395 WTM 26 x 12 × 317 W 33 × 15.75 × 201 WTM 33 × 11.5 × 204 W 36×12 ×182 WTM 24 × 12 × 343 NTM 24 x 9 x 319 WTM 27 × 10 × 27 1 WTM 27 × 14 × 258 NTM 21 × 12.25 × 364 # 14×16 × 605 WTM 28 × 12 × 270 WTM 24 × 12.75 × 306 WTM 30 × 10.5 × 226 W 36×12 ×170 WTM 33 × 11.5 × 187 WTM 26 x 12 × 289

# 30×15 × 211 #TM 22×12 × 357 #TM 24×12 × 310 #TM 28×12 × 247

WTM 27 x 10 × 247 W. 40×12 ×149 WTM 24 x 9 x 291 ₩ 36×12 ×160 WTM 27 × 14 × 235 WTM 21 x 12.25 x 333 ITM 24 × 12.75 × 279 WTM 30 x 10.5 × 207 II 14×16 ×550 #TM 33 x 11.5 × 169 MTM 26 x 12 × 264 1 30×15 ×191 NTW 22 x 12 x 326 ₩ 36×12 ×150 WTM 27 x 14 × 217 NTM 28 x 12 x 226 WTW 24 x 12 × 280 MM 24 x 9 x 264

M27×10 × 221 M24×12·75×250 M30×10.5 × 185 M21×12·25×300 M26×12 × 241 14×16 × 500 30×15 × 173 33×11.5 × 152 M22×12 × 295 M27×14 × 194



# MOMENT OF INERTIA SELECTION TABLE For W and WTM shapes

 $I_{\mathsf{X}}$ 

| 16700<br>16600 | Shape   | In.4                  | Shape                                    |   | Shape  | $I_x$ |
|----------------|---|-----------------------|--|---|--|-------|
|                |   | III.4                 | 1/* 84                                   | In.4  | 1 1 1  | In.4  |
|                |   | 44000                 | W 00 10 105                              |   |  |       |
|                | W 40 x 12 x 167<br>WTM 32 x 12 x 234  | <b>11600</b><br>11600 | W 36 x 12 x 135                          | 7800  | W 30 × 10.5 × 116  | 4930  |
| 16500          | WTM 22 × 12 × 234<br>WTM 22 × 12 × 395  | 11500                 | WTM 27 × 10 × 201                        | 7780  | WTM 18 × 11 × 234  | 4900  |
| 16100          |   | 11500                 | WTM 24 × 12 × 253                        | 7750  | W 14×16 ×342   | 4900  |
|                |   |                       | WTM 24 × 9 × 239                         | 7740  | WTM 27 × 10 × 129  | 4760  |
|                |   |                       |  |   |  | 4730  |
|                |   |                       |  |   |  | 4600  |
|                |   |                       |  |   | W 24 × 12.75 × 146   | 4580  |
|                |   |                       |  |   |  |       |
|                |   |                       | " OO X III.O X III                       |   |  | 4470  |
|                |   |                       |  |   |  | 4410  |
| 15600          |   |                       |  |   |  | 4330  |
| 15500          |   |                       |  |   |  | 4330  |
|                | /   |                       | WTM 18 × 11 × 311                        | 6960  | WTM 21 × 12.25 × 166   | 4280  |
|                |   |                       | WTM 27 × 10 × 182                        | 6950  | WTM 22 × 8.5 × 161   | 4100  |
|                | WTM 24 × 12.75 × 306  | 10700                 | WTM 24 × 9 × 218                         | 6920  | W 27×10 ×114   | 4090  |
| 1000           | WTM 30 × 10.5 × 226   | 10600                 | WTM 24 × 12 × 228                        | 6850  | W 12×12 ×336   | 4060  |
| 15000          | W 36×12 ×170  | 10500                 | WTM 24 × 12.75 × 207                     | 6820  | W 24 × 12.75 × 131   | 4020  |
| 14000          | WTM 33 × 11.5 × 187   | 10300                 | WTM 21 × 12.25 × 248                     | 6760  | 1 008 P  |       |
|                | WTM 26 × 12 × 289   | 10300                 |  |   | W 30 × 10.5 × 99   | 3990  |
|                | W 30×15 ×211  | 10300                 | W 33 x 11.5 x 130                        | 6710  | WTM 18 × 11 × 192  | 3870  |
|                | WTM 22 × 12 × 357   | 10100                 | WTM 30 × 10.5 × 148                      | 6680  | W 14×16 ×283   | 3840  |
|                | WTM 24 × 12 × 310   | 9850                  | W 14×16 ×426                             | 6600  | WTM 24 × 9 × 128   | 3810  |
|                | WTM 28 × 12 × 247   | 9800                  |  |   |  | 3660  |
|                | WTM 27 × 10 × 247   | 9780                  |  |   |  | 3630  |
|                |   |                       |  |   |  | 3620  |
|                | W 40 × 12 × 149   | 9780                  |  |   |  | 3550  |
|                |   |                       |  |   |  | 3540  |
| 13900          |   |                       |  |   |  | 3450  |
| 13800          |   |                       |  |   |  | 3400  |
|                |   |                       |  |   |  | 3400  |
|                |   |                       |  |   |  | 3310  |
|                |   |                       |  |   | VV 11V1 22 X 0.5 X 155   | 3310  |
| 13400          |   |                       | W11V127 X 10 X 139                       | 3930  | W 27 × 10 × 04   | 3270  |
|                |   |                       | W 22 11 F 110                            | 5000  |  | 3220  |
|                |   |                       |  |   |  | 3110  |
|                |   |                       |  |   |  |       |
|                |   |                       |  |   |  | 3100  |
|                |   |                       |  |   |  | 3060  |
|                | - 00 X 12 X 100   |                       |  |   |  | 3010  |
| 1.00           |   |                       |  |   |  | 3000  |
|                |   |                       |  |   |  | 2960  |
|                |   |                       |  |   | WTM 22 × 8.5 × 118   | 2870  |
|                |   |                       |  |   | 801.0  |       |
| 12400          |   |                       |  |   |  | 2850  |
| 12400          |   |                       |  |   |  | 2750  |
| 12400          |   |                       |  |   |  | 2720  |
| 12300          |   |                       |  |   |  | 2700  |
| 12200          |   | 8400                  |  |   |  | 2670  |
|                |   | 8210                  | W 24 × 12.75 × 162                       | 5170  |  | 2660  |
|                | 10 X 110  | 8200                  | WTM 22 × 8.5 × 194                       | 5090  | WTM 18 × 11 × 130  | 2460  |
| 12100          | W 33 × 11.5 × 152   | 8160                  | WTM 24 × 9 × 163                         | 5000  | W 12 × 12 × 230  | 2420  |
| 12000          | WTM 22 × 12 × 295   | 8010                  | 10 10 10 10 10 10 10 10 10 10 10 10 10 1 |   | W 21 × 12.25 × 101   | 2420  |
| 11900          | WTM 27 × 14 × 194   | 7820                  |  |   | W 14×16 ×193   | 2400  |
| 11900          |   |                       |  |   |  |       |
| 11700          |   |                       |  |   |  |       |
|                |   |                       |  |   | Maria de la constante de la co |       |
|                | 12400<br>12400<br>12300<br>12200<br>12100<br>12100<br>12000<br>11900<br>11900 | NEW Color             | 1810                                     | 15(0)   WTM 33 × 11.5 × 204   11400   WTM 21 × 12.25 × 275   15800   W 36 × 12 × 882   11300   WTM 26 × 12 × 221   WTM 24 × 9 × 319   10900   W 33 × 11.5 × 141   WTM 27 × 10 × 271   10900   W 14 × 16 × 455   WTM 27 × 11 × 258   10800   WTM 22 × 12 × 269   WTM 27 × 12.25 × 364   10800   WTM 22 × 12 × 269   WTM 24 × 12.75 × 306   10700   WTM 24 × 12.75 × 306   10700   WTM 24 × 12.75 × 306   WTM 24 × 12.75 × 306   WTM 24 × 12.75 × 207   WTM 30 × 10.5 × 226   10600   WTM 24 × 12.75 × 207   WTM 30 × 10.5 × 226   10600   WTM 24 × 12.75 × 207   WTM 30 × 10.5 × 226   10600   WTM 24 × 12.75 × 207   WTM 24 × 12.25 × 248   WTM 24 × 12.75 × 207   WTM 24 × 12.25 × 248   WTM 24 × 12.25 × 247   9800   WTM 24 × 12.25 × 236   WTM 24 × 12.25 × 236   WTM 24 × 12.25 × 233   9610   WTM 24 × 12.25 × 223   WTM 24 × 12.25 × 226   9050   WTM 24 × 12.25 × 216   WTM 24 × 12.25 × 206   WTM 24 × 12.25 × 206 | 1810   | Sign  |

## MOMENT OF INERTIA SELECTION TABLE For W and WTM shapes

| Shape              | $I_X$ | Shape            | $I_{\chi}$ | Shape                                   | Ix   |
|--------------------|-------|------------------|------------|---|------|
| 5.00               | In.4  |                  | In.4       | 10                                      | In:  |
| W24 × 9 × 84       | 2370  | W 21 × 6.5 × 44  | 847        | *W 14 × 5 × 22                          | 200  |
| W 18 × 11 × 119    | 2190  | W 12 × 12 × 96   | 833        | W 8×8 ×48                               | 184  |
| W 14×16 × 176      | 2140  | W 18 × 7.5 × 50  | 800        | W 10×8 ×33                              | 171  |
| W 12 × 12 × 210    | 2140  | W 14×10 × 74     | 796        | W 10×5.75×30                            | 170  |
| M JEANE ALIN       | 2.140 | W 16 × 7 × 57    | 758        | AND DESCRIPTION OF THE PERSON NAMED AND | 1110 |
| W 24 × 9 × 76      | 2100  | W 12 × 12 × 87   | 740        | *W 12×4 ×22                             | 156  |
| W 21 × 8.25 × 93   | 2070  | W 14 × 10 × 68   | 723        | W 8×8 ×40                               | 146  |
| W 18 × 11 × 106    | 1910  | W 10 × 10 × 112  | 716        | W 10×5.75×26                            | 144  |
| W 14 × 16 × 159    | 1900  | *W 18 × 6 × 46   | 713        |   |      |
| W 12 × 12 × 190    | 1890  | W 12 × 12 × 79   | 662        | *W 12×4 ×19                             | 130  |
| W 21 × 8.25 × 83   | 1830  | W 16 × 7 × 50    | 659        | W 8×8 ×35                               | 127  |
|                    |       | W 14 × 10 × 61   | 640        | W 10×5.75×22                            | 118  |
| W 24 × 9 × 68      | 1830  | W 10 × 10 × 100  | 623        | W 8×8 ×31                               | 110  |
| W 18 × 11 × 97     | 1750  | W 10 X 10 X 100  | 02.0       | *W 12×4 ×16                             | 103  |
| W 14 × 16 × 145    | 1710  | "W 18 × 6 × 40   | 613        | W 8×6.5 ×28                             | 98   |
| W 12 × 12 × 170    | 1650  | W 12×12 × 72     | 597        | *W 10×4 ×19                             | 96   |
| W 21 × 8.25 × 73   | 1600  | W 16 × 7 × 45    | 586        |   | 90   |
| W 24 × 7 × 62      | 1580  | *W 14 × 8 × 53   | 541        | "W 12×4 ×14                             | 88   |
| W 18 × 11 × 86     | 1530  | W 10 × 10 × 88   | 534        | W 8×6.5 ×24                             | 82   |
| W 14 × 14.5 × 132  |       | W 12 × 12 × 65   | 533        | *W 10×4 ×17                             | 81   |
| W 16 × 10.25 × 100 | 1490  |                  |            | W 8×5.25×21                             | 75   |
| W 21 × 8.25 × 68   | 1480  | W16 × 7 × 40     | 518        | *W 10×4 ×15                             | 68   |
| W 12 × 12 × 152    | 1430  | *W 18 × 6 × 35   | 511        | W 8×5.25×18                             | 61   |
| W 14 × 14.5 × 120  | 1380  | *W 14 × 8 × 48   | 485        |   |      |
| M 10 X 10 D X 150  |       | W 12 × 10 × 58   | 475        | *W 10 × 4 × 12                          | 53.  |
| W 24 x 7 x 55      | 1370  | W 10 × 10 × 77   | 455        | W 6×6 ×25                               | 53   |
| W 18 × 11 × 76     | 1330  | W 16 x 7 x 36    |            | *W 8×4 ×15                              | 48   |
| W 21 × 8 25 × 62   |       |                  | 448        | W 6×6 ×20                               | 41   |
| W 16 × 10.25 × 89  | 1300  | *W 14 × 8 × 43   | 428        | *W 8×4 ×13                              | 39   |
| W 14 × 14.5 × 109  | 1240  | W 12 × 10 × 53   | 425        | *W 6×4 ×16                              | 32   |
| W 12 × 12 × 136    | 1240  | *W 12 × 8 × 50   | 394        | "W 8×4 ×10                              | 30.  |
| W 18 × 7.5 × 71    | 1170  | W 10 × 10 × 68   | 394        | W 6×6 ×15                               | 29   |
| W21× 65 × 57       | 1170  | W 14 × 6.75 × 38 | 385        | W 5×5 ×19                               | 26   |
| W 14 × 14.5 × 99   | 1110  | "W 16 × 5.5 × 31 | 376        | *W 6×4 ×12                              |      |
| W 16 × 10.25 × 77  | 1110  | *W 12 × 8 × 45   | 350        |   | 22   |
| W 12 × 12 × 120    | 1070  | W 10 × 10 × 60   | 341        | W 5×5 ×16                               | 21   |
| W 18 × 7.5 × 65    | 1070  | W 14 × 6.75 × 34 | 340        | *W 6×4 × 9                              | 16.  |
| W 14 × 14.5 × 90   | 999   | *W 12 × 8 × 40   |            | M 4×4 ×16.3                             | 14   |
|                    |       | W 10 × 10 × 54   | 303        | M 4×4 ×13.8                             | 10   |
| W 21 × 6.5 × 50    | 989   |                  |            | M 4×4 ×13                               | 10   |
| W 18 × 7.5 × 60    | 984   | "W 16 × 5.5 × 26 | 302        |   |      |
| W 16 × 10.25 × 67  | 954   | W 14 × 6.75 × 30 | 291        |   |      |
| W 12 × 12 × 106    | 933   | W 12 × 6.5 × 35  | 285        |   |      |
| W 18 × 7.5 × 55    | 890   | W 10 × 10 × 49   | 272        |   |      |
| W 14 × 10 × 82     | 882   | W 8 × 8 × 67     | 272        |   |      |
|                    |       | W 10 × 8 × 45    | 248        |   |      |
|                    |       | *W 14 × 5 × 26   | 246        |   |      |
|                    |       | W 12 × 6.5 × 30  | 238        |   |      |
|                    |       | W 8 × 8 × 58     | 228        |   |      |
|                    |       | W 10 × 8 × 39    | 209        |   |      |
|                    |       | W 12 × 6.5 × 26  | 204        |   |      |

<sup>\*</sup> Presently not available in our rolling program

 $F_{y} = 36 \text{ ksi}$ 

199

100

Res Lis the span in Total allowable unit End reaction in kip Midspen deflection

is abraced lengths ( 4500 l<sub>2</sub> = 24 kSi.

| Shape                                   | $I_{x}$ |
|---|---------|
|   | In.4    |
| 4 × 5 × 22                              |         |
| 8×8 ×48                                 | 200     |
| 10×8 ×33                                | 184     |
| 10 × 5.75 × 30                          | 171     |
|   | 170     |
| 12 x 4 x 22                             | 156     |
| 8×8 ×40                                 | 146     |
| 10 × 5.75 × 26                          | 144     |
| 19 v 440                                |         |
| 12 x 4 x 19<br>8 x 8 x 35               | 130     |
| 8 × 8 × 35<br>10 × 5.75 × 22            | 127     |
| 8×8 ×31                                 | 118     |
| 0 X 0 X 3 1                             | 110     |
| 12×4 ×16                                | 103     |
| 8 × 6.5 × 28                            | 98.0    |
| 10×4 ×19                                | 96.3    |
| 12×4 ×14                                |         |
| 9 4 X 14                                | 88.6    |
| 8 × 6.5 × 24<br>10 × 4 × 17             | 82.8    |
| 8 × 5.25 × 21                           | 75.3    |
| 10 × 4 × 15                             | 68.9    |
| 8 × 5.25 × 18                           | 61.9    |
| 0 X 3.23 X 10                           | 01.3    |
| 10 x 4 x 12                             | 53.8    |
| 6×6 ×25                                 | 53.4    |
| 8×4 ×15                                 | 48.0    |
| 6×6 ×20                                 | 41.4    |
| 8×4 ×13                                 | 39.6    |
| 6×4 ×16                                 | 32.1    |
| 8×4 ×10                                 | 30.8    |
|   | 29.1    |
|   | 26.3    |
| 5×5 ×19                                 | 22.1    |
| 6×4 ×12                                 | 21.4    |
| 5×5 ×16                                 | 21.4    |
| 6×4 × 9                                 | 16.4    |
| 4×4 ×16.3                               | 14.0    |
| 4×4 ×13.8                               | 10.8    |
| 4 | 10.5    |

4×4 ×13

|                 | Wc      | V   | $L_v$ | $L_c$ | $L_{u}$ | R    | $R_i$ | Ne   | S    | Dc     |
|-----------------|---------|-----|-------|-------|---------|------|-------|------|------|--------|
| Shape           | Kip-ft. | Kip | Ft.   | Ft.   | Ft.     | Kip  | Kip   | In.  | In.3 | In./Ft |
| V 40 × 18 × 328 | 21400   | 524 | 20.4  | 18.9  | 35.9    | 163  | 24.6  | 18.2 | 1340 | 0.62   |
| 298             | 19500   | 474 | 20.6  | 18.8  | 32.8    | 146  | 22.4  | 18.2 | 1220 | 0.63   |
| 268             | 17400   | 425 | 20.5  | 18.7  | 29.5    | 128  | 20.3  | 18.2 | 1090 | 0.63   |
| 244             | 15700   | 399 | 19.7  | 18.7  | 26.4    | 117  | 19.2  | 18.2 | 983  | 0.6    |
| 221             | 13700   | 395 | 17.3  | 18.7  | 22.6    | 114  | 19.2  | 18.2 | 858  | 0.6    |
| 192             | 11300   | 391 | 14.5  | 17.8  | 19.7    | 110  | 19.2  | 18.1 | 708  | 0.6    |
| V 40 × 16 × 277 | 17600   | 474 | 18.6  | 16.7  | 29.1    | 146  | 22.4  | 18.2 | 1100 | 0.6    |
| 249             | 15900   | 425 | 18.7  | 16.6  | 26.3    | 128  | 20.3  | 18.2 | 992  | 0.6    |
| 215             | 13700   | 365 | 18.8  | 16.6  | 22.8    | 107  | 17.5  | 18.2 | 858  | 0.6    |
| 199             | 12300   | 362 | 17.0  | 16.6  | 20.1    | 104  | 17.5  | 18.2 | 769  | 0.6    |
| 174             | 10200   | 358 | 14.3  | 15.8  | 17.4    | 101  | 17.5  | 18.1 | 636  | 0.6    |
| V 40 × 12 × 235 | 14000   | 474 | 14.8  | 12.6  | 21.8    | 146  | 22.4  | 18.2 | 874  | 0.6    |
| 211             | 12600   | 425 | 14.8  | 12.5  | 19.7    | 128  | 20.3  | 18.2 | 785  | 0.6    |
| 183             | 10900   | 365 | 14.9  | 12.5  | 17.1    | 107  | 17.5  | 18.2 | 682  | 0.6    |
| 167             | 9580    | 361 | 13.3  | 12.5  | 14.5    | 104  | 17.5  | 18.1 | 599  | 0.6    |
| 149             | 8190    | 347 | 11.8  | 11.9  | 12.6    | 97.8 | 17.0  | 18.1 | 512  | 0.6    |
|                 |         |     |       |       |         |      |       |      |      |        |
|                 |         |     |       |       |         |      |       |      |      | 1      |
|                 |         |     |       |       |         |      |       |      |      |        |
|                 |         |     |       |       |         |      |       |      |      |        |
|                 |         |     |       |       |         |      |       |      |      |        |
|                 |         |     |       |       |         |      |       |      |      |        |
|                 |         |     |       |       |         |      |       |      |      |        |
|                 |         |     |       |       |         |      |       |      |      |        |
|                 |         |     |       |       | 646     |      |       |      |      |        |
|                 |         |     |       |       |         |      |       |      |      |        |
|                 |         |     |       |       |         |      |       |      |      |        |
|                 |         |     |       |       |         |      |       |      |      |        |
|                 |         |     |       |       |         |      |       |      |      |        |
|                 | 1 8     |     |       |       |         |      |       |      |      |        |
|                 | 1911    |     |       |       |         |      |       |      |      |        |
|                 |         |     |       |       |         |      |       |      |      |        |
|                 |         |     |       |       |         |      |       |      |      |        |
|                 |         |     |       |       |         |      |       |      |      |        |
|                 |         |     |       |       |         |      |       |      |      |        |
|                 |         |     |       |       |         |      |       |      |      |        |
|                 |         |     |       |       |         |      |       |      |      |        |
|                 |         |     |       |       |         |      |       |      |      |        |

Notes:

Where L is the span in feet:

Total allowable uniform load in kips  $= W_{\rm c}/L$ .

End reaction in kips =  $W_c/2L$ . Midspan deflection in inches =  $D_c \times L^2/1000$ .

For unbraced lengths greater than  $L_c$  and less than  $L_w$  multiply the constants  $W_c$  and  $D_c$  by the ratio  $22/F_b$ . where  $F_b = 24 \text{ ksi}$ 

I

# 40" Wide flange and tailor-made beams Uniform load constants for beams laterally supported

| Shape               | $W_c$   | V    | Lo   | L    | Lu   | R   | $R_i$        | N <sub>e</sub> | 5            | L    |
|---------------------|---------|------|------|------|------|-----|--------------|----------------|--------------|------|
| Snape               | Kip-ft. | Kip  | Ft.  | Ft.  | Ft.  | Kip | Kip          | In.            | In.3         | In./ |
| WTM 40 × 16 × 655   | 41400   | 1237 | 16.7 | 17.8 | 63.4 | 449 | 53.2         | 18.3           | 2590         | 0.8  |
| 593                 | 37400   | 1108 | 16.9 | 17.6 | 58.1 | 393 | 48.3         | 18.3           | 2340         | 0.5  |
| 531                 | 33400   | 982  | 17.0 | 17.4 | 52.5 | 340 | 43.5         | 18.3           | 2090         | 0.5  |
| 480                 | 30200   | 879  | 17.2 | 17.3 | 47.8 | 296 | 39.4         | 18.3           | 1890         | 0.5  |
| 436                 | 27400   | 798  | 17.2 | 17.1 | 43.6 | 265 | 36.2         | 18.2           | 1710         | 0.6  |
| 397                 | 25000   | 719  | 17.4 | 17.0 | 40.1 | 235 | 32.9         | 18.2           | 1560         | 0.6  |
| 362                 | 22700   | 654  | 17.4 | 16.9 | 36.8 | 208 | 30.2         | 18.3           | 1420         | 0.6  |
| 324                 | 20500   | 578  | 17.7 | 16.8 | 33.2 | 181 | 27.0         | 18.2           | 1280         |      |
| 297                 | 18700   | 534  | 17.5 | 16.7 | 30.3 | 165 | 25.1         | 18.2           | 1170         | 0.6  |
| WTM 40 × 12 × 561   | 33300   | 1237 | 13.5 | 13.6 | 48.6 | 449 | 53.2         | 18.3           | 2080         | 0.5  |
| 520                 | 30700   | 1137 | 13.5 | 13.5 | 45.5 | 405 | 49.4         | 18.3           | 1920         | 0.5  |
| 475                 | 28000   | 1037 | 13.5 | 13.4 | 41.7 | 362 | 45.6         | 18.3           | 1750         | 0.5  |
| 437                 | 25800   | 946  | 13.6 | 13.2 | 38.5 | 324 | 42.1         | 18.3           | 1610         | 0.5  |
| 396                 | 23400   | 852  | 13.7 | 13.1 | 35.2 | 288 | 38.3         | 18.2           | 1460         | 0.6  |
| 359                 | 21100   | 771  | 13.7 | 12.9 | 32.0 | 252 | 35.1         | 18.3           | 1320         | 0.6  |
| 327                 | 19200   | 693  | 13.9 | 12.8 | 29.4 | 223 | 31.9         | 18.3           | 1200         | 0.6  |
| 294                 | 17300   | 617  | 14.0 | 12.7 | 26.6 | 195 | 28.6         | 18.2           | 1080         | 0.6  |
| 264                 | 15500   | 553  | 14.0 | 12.6 | 23.9 | 172 | 25.9         | 18.2           | 971          | 0.6  |
| VTM 36 × 16.5 × 848 | 50700   | 1540 | 16.5 | 19.1 | 89.6 | 625 | 68.0         | 17.0           | 3170         | 0.5  |
| 798                 | 47700   | 1438 | 16.6 | 19.0 | 85.1 | 574 | 64.3         | 16.9           | 2980         | 0.5  |
| 720                 | 43000   | 1284 | 16.7 | 18.8 | 77.9 | 501 | 58.5         | 16.9           | 2690         | 0.6  |
| 650                 | 38700   | 1148 | 16.9 | 18.6 | 71.2 | 435 | 53.2         | 16.9           | 2420         | 0.6  |
| 588                 | 34900   | 1027 | 17.0 | 18.4 | 65.3 | 381 | 48.3         | 16.9           | 2180         | 0.6  |
| 527                 | 31200   | 909  | 17.2 | 18.2 | 59.2 | 329 | 43.5         | 16.8           |              |      |
| 485                 | 28600   | 837  | 17.1 | 18.1 | 54.8 | 296 | 40.5         |                | 1950         | 0.6  |
| 439                 | 25900   | 749  | 17.3 | 17.9 | 50.1 | 259 | 36.7         | 16.8           | 1790         | 0.6  |
| 393                 | 23200   | 664  | 17.5 | 17.8 | 45.3 | 224 | 32.9         | 16.8           | 1620         | 0.6  |
| 359                 | 21100   | 603  | 17.5 | 17.7 | 41.6 | 200 |              | 16.8           | 1450         | 0.6  |
| 328                 | 19400   | 545  | 17.8 | 17.6 | 38.4 | 179 | 30.2<br>27.5 | 16.8<br>16.8   | 1320<br>1210 | 0.6  |
| VTM 36 × 12 × 548   | 30900   | 1165 | 13.3 | 14.0 | 52.8 | 422 | 53.2         | 17.5           | 1930         | 0.6  |
| 508                 | 28600   | 1069 | 13.4 | 13.8 | 49.4 | 383 | 49.4         | 17.4           | 1790         | 0.6  |
| 464                 | 26100   | 974  | 13.4 | 13.7 | 45.3 | 342 | 45.6         | 17.3           | 1630         | 0.6  |
| 426                 | 23800   | 889  | 13.4 | 13.5 | 42.0 | 303 | 42.1         | 17.4           | 1490         | 0.6  |
| 387                 | 21600   | 799  | 13.5 | 13.4 | 38.4 | 268 | 38.3         | 17.3           | 1350         | 0.6  |
| 350                 | 19500   | 723  | 13.5 | 13.2 | 34.9 | 237 | 35.1         | 17.3           |              |      |
| 318                 | 17800   | 649  | 13.7 | 13.1 | 32.1 | 209 | 31.9         |                | 1220         | 0.6  |
| 286                 | 16000   | 577  | 13.9 | 13.0 | 29.1 | 182 | 28.6         | 17.3           | 1110         | 0.6  |
| 256                 | 14300   | 517  | 13.8 | 12.9 | 26.1 | 159 |              | 17.3           | 1000         | 0.6  |
| 232                 | 12900   | 465  | 13.9 | 12.8 |      |     | 25.9         | 17.3           | 895          | 0,6  |
|                     | -2200   | -30  | 10.0 | 12.0 | 23.7 | 141 | 23.5         | 17.3           | 809          | 0.6  |
|                     |         |      |      |      |      |     |              |                |              |      |

Notes:

Where L is the span in feet:

Total allowable uniform load in kips =  $W_c/L$ 

End reaction in kips =  $W_{\chi}/2L$ 

Midspan deflection in inches =  $D_r \times L^{2/1000}$ 

For unbraced lengths greater than  $L_{\chi}$  and less than  $L_{y}$ , multiply the constants  $W_{\chi}$  and  $D_{\chi}$  by the ratio 22/i where  $F_{b}=24$  ksi.

A

Shape #74/33 x 15.75 x 619 567

#W35×11.5 ×520

## 2 x 12 x 511 462 418

Hers Lie the span in

Total allowable un find reaction in ki Mospan deflectio

was deflection was a series of the series of

 $F_y = 36 \text{ ks}$ ,  $F_y = 36 \text{ ksi}$ 

#### **BEAMS**

## 40" Wide flange and tailor-made beams Uniform load constants for beams laterally supported

| In.  |      | Dc       | 01                  | Wc      | V    | Lo   | $L_c$ | Lu   | R   | $R_i$ | $N_e$ | S    | $D_c$   |
|------|------|----------|---------------------|---------|------|------|-------|------|-----|-------|-------|------|---------|
| in.  | In.3 | In./Ft/2 | Shape               | Kip-ft. | Kip  | Ft.  | Ft.   | Ft.  | Kip | Kip   | In.   | In.3 | In./Ft. |
| 18.3 | 2590 | 0.5      |                     |         |      |      |       |      |     |       |       |      |         |
| 18.3 | 2340 | 0.57     | WTM 33 × 15.75 × 61 | 9 34700 | 1091 | 15.9 | 17.8  | 72.0 | 419 | 53.2  | 16.1  | 2170 | 0.65    |
| 18.3 | 2090 |          | 56                  | 7 31800 | 988  | 16.1 | 17.7  | 66.9 | 370 | 48.9  | 16.2  | 1990 | 0.65    |
| 18.3 | 1890 | 0.59     | 51                  | 5 29000 | 888  | 16.3 | 17.5  | 61.5 | 326 | 44.5  | 16.1  | 1810 | 0.66    |
| 18.2 | 1710 | 0.59     | 46                  | 8 26100 | 806  | 16.2 | 17.4  | 56.3 | 287 | 41.0  | 16.1  | 1630 | 0.67    |
| 18.2 |      | 0.60     | 42                  | 4 23700 | 722  | 16.4 | 17.2  | 51.5 | 254 | 37.3  | 16.1  | 1480 | 0.68    |
| 18.3 | 1560 | 0.61     | 38                  | 7 21600 | 652  | 16.6 | 17.1  | 47.6 | 225 | 34.0  | 16.0  | 1350 | 0.69    |
| 18.2 | 1420 | 0.61 ,   | 35                  | 4 19700 | 594  | 16.6 | 17.0  | 43.8 | 200 | 31.3  | 16.1  | 1230 | 0.70    |
|      | 1280 | 0.62     | 31                  |         | 527  | 16.9 | 16.9  | 39.8 | 174 | 28.1  | 16.1  | 1110 | 0.71    |
| 18.2 | 1170 | 0.62     | 29                  |         | 482  | 16.8 | 16.8  | 36.6 | 157 | 25.9  | 16.0  | 1010 | 0.71    |
|      |      | 3        | 26                  |         | 433  | 17.0 | 16.7  | 33.3 | 138 | 23.5  | 16.0  | 917  | 0.72    |
| 18.3 | 2080 | 0.57     | -                   | 14700   | 400  | 17.0 | 10.7  | 00.0 | 100 | 20.0  | 10.0  | 317  | 0.72    |
| 18.3 | 1920 | 0.58     | WTM 33 × 11.5 × 52  | 27400   | 1091 | 12.6 | 13.5  | 54.5 | 419 | 53.2  | 16.1  | 1710 | 0.65    |
| 18.3 | 1750 | 0.58     | 47                  |         | 988  | 12.6 | 13.3  | 50.5 | 370 | 48.9  | 16.1  | 1560 |         |
| 18.3 | 1610 | 0.59     | 43                  |         | 888  | 12.8 | 13.2  |      | 326 |       |       |      | 0.65    |
| 18.2 | 1460 | 0.60     | 39                  |         | 818  | 12.7 |       | 46.2 |     | 44.5  | 16.1  | 1420 | 0.66    |
| 18.3 | 1320 | 0.60     |                     |         |      |      | 13.1  | 42.8 | 294 | 41.6  | 16.1  | 1300 | 0.67    |
| 18.3 | 1200 | 0.61     | 36                  |         | 734  | 12.9 | 12.9  | 39.2 | 258 | 37.8  | 16.1  | 1180 | 0.68    |
| 18.2 | 1080 | 0.61     | 33                  |         | 674  | 12.8 | 12.8  | 36.2 | 233 | 35.1  | 16.1  | 1080 | 0.69    |
| 18.2 | 971  | 0.62     | 30                  |         | 605  | 13.0 | 12.7  | 33.3 | 207 | 31.9  | 16.0  | 983  | 0.70    |
| 14.2 | 011  | 0.02     | 27                  |         | 538  | 13.1 | 12.6  | 30.2 | 179 | 28.6  | 16.0  | 884  | 0.70    |
| 17.0 | 3170 | 0.58     | . 24                |         | 482  | 13.2 | 12.5  | 27.1 | 157 | 25.9  | 16.0  | 791  | 0.71    |
| 16.9 | 2980 | 0.59     | 21                  |         | 433  | 13.2 | 12.3  | 24.6 | 138 | 23.5  | 16.0  | 714  | 0.72    |
| 16.9 | 2690 | 0.60     | 20                  |         | 400  | 13.2 | 12.3  | 22.9 | 126 | 21.9  | 16.0  | 662  | 0.72    |
|      |      | 100      | 18                  |         | 368  | 13.2 | 12.2  | 21.1 | 114 | 20.3  | 16.0  | 607  | 0.73    |
| 16.9 | 2420 | 0.61     | 16                  | 9 8790  | 326  | 13.5 | 12.1  | 19.2 | 101 | 18.1  | 16.0  | 549  | 0.73    |
| 16.9 | 2180 | 0.62     |                     |         |      |      |       |      |     |       |       |      |         |
| 16.8 | 1950 | 0.63     | WTM 32 × 12 × 51    | 1 25300 | 1021 | 12.4 | 13.7  | 59.2 | 445 | 53.2  | 14.3  | 1580 | 0.69    |
| 16.8 | 1790 | 0.64     | 46                  | 22900   | 911  | 12.6 | 13.5  | 54.2 | 390 | 48.3  | 14.3  | 1430 | 0.70    |
| 16.8 | 1620 | 0.65     | 41                  | 8 20600 | 817  | 12.6 | 13.4  | 49.7 | 341 | 44.0  | 14.3  | 1290 | 0.71    |
| 16.8 | 1450 | 0.66     | 38                  | 0 18700 | 740  | 12.6 | 13.2  | 45.4 | 304 | 40.5  | 14.3  | 1170 | 0.72    |
| 16.8 | 1320 | 0.66     | 34                  | 3 17000 | 662  | 12.8 | 13.1  | 41.4 | 266 | 36.7  | 14.3  | 1060 | 0.73    |
| 16.8 | 1210 | 0.67     | 31                  | 3 15400 | 596  | 12.9 | 12.9  | 38.1 | 236 | 33.5  | 14.2  | 963  | 0.74    |
|      |      |          | 28                  | 6 14100 | 542  | 13.0 | 12.8  | 35.0 | 212 | 30.8  | 14.2  | 878  | 0.75    |
| 17.5 | 1930 | 0.60     | 25                  | 6 12600 | 479  | 13.2 | 12.7  | 31.6 | 184 | 27.5  | 14.2  | 788  | 0.76    |
| 17.4 | 1790 | 0.61,    | 23                  |         | 437  | 13.2 | 12.6  | 29.0 | 165 | 25.4  | 14.2  | 719  | 0.77    |
| 17.3 | 1630 | 0.62     |                     |         |      |      |       |      |     |       |       |      |         |
| 17.4 | 1490 | 0.63     |                     |         |      |      |       |      |     |       |       |      |         |
| 17.3 | 1350 | 0.64     |                     |         |      |      |       |      |     |       |       |      |         |
| 17.3 | 1220 | 0.64     |                     |         |      |      |       |      |     |       |       |      |         |
| 17.3 | 1110 | 0.65     |                     |         |      |      |       |      |     |       |       |      |         |
| 17.3 | 1000 | 0.66     |                     |         |      |      |       |      |     |       |       |      |         |
|      | 895  | 0.66     |                     |         |      |      |       |      |     |       |       |      |         |
| 17.3 | 809  | 0.67     |                     |         |      |      |       |      |     |       |       |      |         |
| 17.3 | 000  |          |                     |         |      |      |       |      |     |       |       |      |         |
|      |      |          |                     |         |      |      |       |      |     |       |       |      |         |
|      |      |          |                     |         |      |      |       |      |     |       |       |      |         |

Where L is the span in feet:

Total allowable uniform load in kips =  $W_c/L$ .

End reaction in kips =  $W_c/2L$ .

Midspan deflection in inches =  $D_c \times L^2 / 1000$ .

For unbraced lengths greater than  $L_c$  and less than  $L_u$ , multiply the constants  $W_c$  and  $D_c$  by the ratio  $22/F_b$ . where  $F_b = 24 \text{ ksi.}$ 

 $V_c$  and  $D_c$  by the ratio 22/F

Shape

No

New Lie the span in t

Total allowable unit

find reaction in kips

Mosper deflection

orbinsed lengths of

 $\kappa_{\rm BB} \, I_{\rm b} = 24 \; \rm ksi$ 

#### 40" Wide flange and tailor-made beams Uniform load constants for beams laterally supported

| 1004<br>896<br>803<br>727<br>650<br>586<br>532<br>470<br>423<br>374<br>1004<br>908<br>815<br>739<br>661<br>597<br>661<br>593<br>491 | L <sub>v</sub> Ft. 14.9 15.0 15.3 15.2 15.4 15.5 15.8 15.6 15.9 11.3 11.5 11.6 11.7                  | Ft. 17.1 16.9 16.7 16.6 16.5 16.3 16.2 16.1 16.0 15.9 12.5 12.3 12.1 12.0 11.8 11.7                          | 75.0<br>68.9<br>63.3<br>58.0<br>53.1<br>48.9<br>45.0<br>40.8<br>36.6<br>33.4<br>54.6<br>50.6<br>46.4<br>42.3<br>38.7                 | Kip 416 362 319 281 248 218 194 169 149 129 416 370 323 287  | 53.2<br>48.3<br>44.0<br>40.5<br>36.7<br>33.5<br>30.8<br>27.5<br>25.1<br>22.4<br>53.2<br>48.9<br>44.5<br>41.0   | In.  14.6 14.5 14.5 14.5 14.5 14.5 14.5 14.4 14.4  | 1870<br>1680<br>1530<br>1530<br>1250<br>1140<br>1030<br>928<br>827<br>746<br>1420<br>1290<br>1170  | 0.77<br>0.77<br>0.77<br>0.77<br>0.77<br>0.77<br>0.77<br>0.77  |
|---|--|--|--|--|--|--|--|---|
| 896<br>803<br>727<br>650<br>586<br>532<br>470<br>423<br>374<br>1004<br>908<br>815<br>739<br>661<br>597<br>543<br>491                | 15.0<br>15.3<br>15.2<br>15.4<br>15.5<br>15.8<br>15.6<br>15.9<br>11.3<br>11.5<br>11.5<br>11.6         | 16.9<br>16.7<br>16.6<br>16.5<br>16.3<br>16.2<br>16.1<br>16.0<br>15.9<br>12.5<br>12.3<br>12.1<br>12.0<br>11.8 | 68.9<br>63.3<br>58.0<br>53.1<br>48.9<br>45.0<br>40.8<br>36.6<br>33.4<br>54.6<br>50.6<br>46.4<br>42.3                                 | 362<br>319<br>281<br>248<br>218<br>194<br>169<br>149<br>129<br>416<br>370<br>323   | 48.3<br>44.0<br>40.5<br>36.7<br>33.5<br>30.8<br>27.5<br>25.1<br>22.4<br>53.2<br>48.9<br>44.5   | 14.5<br>14.5<br>14.5<br>14.5<br>14.5<br>14.5<br>14.4<br>14.4   | 1680<br>1530<br>1380<br>1250<br>1140<br>1030<br>928<br>827<br>746<br>1420<br>1290  | 0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7   |
| 896<br>803<br>727<br>650<br>586<br>532<br>470<br>423<br>374<br>1004<br>908<br>815<br>739<br>661<br>597<br>543<br>491                | 15.0<br>15.3<br>15.2<br>15.4<br>15.5<br>15.8<br>15.6<br>15.9<br>11.3<br>11.5<br>11.5<br>11.6         | 16.9<br>16.7<br>16.6<br>16.5<br>16.3<br>16.2<br>16.1<br>16.0<br>15.9<br>12.5<br>12.3<br>12.1<br>12.0<br>11.8 | 68.9<br>63.3<br>58.0<br>53.1<br>48.9<br>45.0<br>40.8<br>36.6<br>33.4<br>54.6<br>50.6<br>46.4<br>42.3                                 | 319<br>281<br>248<br>218<br>194<br>169<br>149<br>129<br>416<br>370<br>323  | 44.0<br>40.5<br>36.7<br>33.5<br>30.8<br>27.5<br>25.1<br>22.4<br>53.2<br>48.9<br>44.5   | 14.5<br>14.5<br>14.5<br>14.5<br>14.5<br>14.4<br>14.4<br>14.4   | 1530<br>1380<br>1250<br>1140<br>1030<br>928<br>827<br>746<br>1420<br>1290  | 0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7  |
| 803<br>727<br>650<br>586<br>532<br>470<br>423<br>374<br>1004<br>908<br>815<br>739<br>661<br>597<br>543<br>491                       | 15.3<br>15.2<br>15.4<br>15.5<br>15.5<br>15.8<br>15.6<br>15.9<br>11.3<br>11.3<br>11.5<br>11.5<br>11.6 | 16.7<br>16.6<br>16.5<br>16.3<br>16.2<br>16.1<br>16.0<br>15.9<br>12.5<br>12.3<br>12.1<br>12.0<br>11.8         | 63.3<br>58.0<br>53.1<br>48.9<br>45.0<br>40.8<br>36.6<br>33.4<br>54.6<br>50.6<br>46.4<br>42.3   | 319<br>281<br>248<br>218<br>194<br>169<br>149<br>129<br>416<br>370<br>323  | 44.0<br>40.5<br>36.7<br>33.5<br>30.8<br>27.5<br>25.1<br>22.4<br>53.2<br>48.9<br>44.5   | 14.5<br>14.5<br>14.5<br>14.5<br>14.5<br>14.4<br>14.4<br>14.4   | 1530<br>1380<br>1250<br>1140<br>1030<br>928<br>827<br>746<br>1420<br>1290  | 0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7  |
| 727<br>650<br>586<br>532<br>470<br>423<br>374<br>1004<br>908<br>815<br>739<br>661<br>597<br>543<br>491                              | 15.2<br>15.4<br>15.5<br>15.8<br>15.6<br>15.9<br>11.3<br>11.3<br>11.5<br>11.5<br>11.6                 | 16.6<br>16.5<br>16.3<br>16.2<br>16.1<br>16.0<br>15.9<br>12.5<br>12.3<br>12.1<br>12.0<br>11.8                 | 53.1<br>48.9<br>45.0<br>40.8<br>36.6<br>33.4<br>54.6<br>50.6<br>46.4<br>42.3   | 248<br>218<br>194<br>169<br>149<br>129<br>416<br>370<br>323  | 36.7<br>33.5<br>30.8<br>27.5<br>25.1<br>22.4<br>53.2<br>48.9<br>44.5   | 14.5<br>14.5<br>14.5<br>14.4<br>14.4<br>14.4<br>14.6<br>14.5<br>14.5   | 1250<br>1140<br>1030<br>928<br>827<br>746<br>1420<br>1290  | 0.7<br>0.7<br>0.7<br>0.7<br>0.7<br>0.7  |
| 650<br>586<br>532<br>470<br>423<br>374<br>1004<br>908<br>815<br>739<br>661<br>597<br>543<br>491                                     | 15.4<br>15.5<br>15.5<br>15.8<br>15.6<br>15.9<br>11.3<br>11.5<br>11.5<br>11.6                         | 16.3<br>16.2<br>16.1<br>16.0<br>15.9<br>12.5<br>12.3<br>12.1<br>12.0<br>11.8                                 | 48.9<br>45.0<br>40.8<br>36.6<br>33.4<br>54.6<br>50.6<br>46.4<br>42.3   | 218<br>194<br>169<br>149<br>129<br>416<br>370<br>323   | 33.5<br>30.8<br>27.5<br>25.1<br>22.4<br>53.2<br>48.9<br>44.5   | 14.5<br>14.4<br>14.4<br>14.4<br>14.6<br>14.5<br>14.5   | 1140<br>1030<br>928<br>827<br>746<br>1420<br>1290  | 0.7<br>0.7<br>0.7<br>0.7<br>0.7   |
| 586<br>532<br>470<br>423<br>374<br>1004<br>908<br>815<br>739<br>661<br>597<br>543<br>491  | 15.5<br>15.5<br>15.8<br>15.6<br>15.9<br>11.3<br>11.5<br>11.5<br>11.6                                 | 16.2<br>16.1<br>16.0<br>15.9<br>12.5<br>12.3<br>12.1<br>12.0<br>11.8   | 45.0<br>40.8<br>36.6<br>33.4<br>54.6<br>50.6<br>46.4<br>42.3   | 194<br>169<br>149<br>129<br>416<br>370<br>323  | 30.8<br>27.5<br>25.1<br>22.4<br>53.2<br>48.9<br>44.5   | 14.5<br>14.4<br>14.4<br>14.4<br>14.5<br>14.5   | 1030<br>928<br>827<br>746<br>1420<br>1290  | 0.7<br>0.7<br>0.7<br>0.7  |
| 470<br>423<br>374<br>1004<br>908<br>815<br>739<br>661<br>597<br>543<br>491  | 15.8<br>15.6<br>15.9<br>11.3<br>11.5<br>11.5<br>11.6   | 16.1<br>16.0<br>15.9<br>12.5<br>12.3<br>12.1<br>12.0<br>11.8   | 40.8<br>36.6<br>33.4<br>54.6<br>50.6<br>46.4<br>42.3   | 169<br>149<br>129<br>416<br>370<br>323   | 27.5<br>25.1<br>22.4<br>53.2<br>48.9<br>44.5   | 14.4<br>14.4<br>14.4<br>14.6<br>14.5<br>14.5   | 928<br>827<br>746<br>1420<br>1290  | 0.7<br>0.7<br>0.7<br>0.7  |
| 423<br>374<br>1004<br>908<br>815<br>739<br>661<br>597<br>543<br>491   | 15.6<br>15.9<br>11.3<br>11.5<br>11.5<br>11.6<br>11.6   | 16.0<br>15.9<br>12.5<br>12.3<br>12.1<br>12.0<br>11.8   | 36.6<br>33.4<br>54.6<br>50.6<br>46.4<br>42.3   | 149<br>129<br>416<br>370<br>323  | 25.1<br>22.4<br>53.2<br>48.9<br>44.5   | 14.4<br>14.4<br>14.6<br>14.5<br>14.5   | 827<br>746<br>1420<br>1290   | 0.7<br>0.7<br>0.7   |
| 374<br>1004<br>908<br>815<br>739<br>661<br>597<br>543<br>491  | 15.9<br>11.3<br>11.5<br>11.5<br>11.6<br>11.6   | 15.9<br>12.5<br>12.3<br>12.1<br>12.0<br>11.8   | 33.4<br>54.6<br>50.6<br>46.4<br>42.3   | 129<br>416<br>370<br>323   | 53.2<br>48.9<br>44.5   | 14.4<br>14.6<br>14.5<br>14.5   | 746<br>1420<br>1290  | 0.7   |
| 374<br>1004<br>908<br>815<br>739<br>661<br>597<br>543<br>491  | 11.3<br>11.3<br>11.5<br>11.5<br>11.6<br>11.6   | 12.5<br>12.3<br>12.1<br>12.0<br>11.8   | 54.6<br>50.6<br>46.4<br>42.3   | 416<br>370<br>323  | 53.2<br>48.9<br>44.5   | 14.6<br>14.5<br>14.5   | 1420<br>1290   | 0.7   |
| 908<br>815<br>739<br>661<br>597<br>543<br>491   | 11.3<br>11.5<br>11.5<br>11.6<br>11.6   | 12.3<br>12.1<br>12.0<br>11.8   | 50.6<br>46.4<br>42.3   | 370<br>323   | 48.9<br>44.5   | 14.5<br>14.5   | 1290   | 0.7   |
| 815<br>739<br>661<br>597<br>543<br>491  | 11.5<br>11.5<br>11.6<br>11.6   | 12.1<br>12.0<br>11.8   | 46.4<br>42.3   | 323  | 44.5   | 14.5   |  |   |
| 739<br>661<br>597<br>543<br>491   | 11.5<br>11.6<br>11.6   | 12.0<br>11.8   | 42.3   |  |  |  | 1170   | 0.7   |
| 661<br>597<br>543<br>491  | 11.6<br>11.6   | 11.8   |  | 287  | 410  |  |  |   |
| 597<br>543<br>491   | 11.6   |  | 38.7   |  |  | 14.5   | 1060   | 0.7   |
| 543<br>491  |  | 11.7   |  | 252  | 37.3   | 14.5   | 955  | 0.7   |
| 491   | 11.7   |  | 35.6   | 223  | 34.0   | 14.5   | 871  | 0.7   |
|   |  | 11.6   | 32.7   | 200  | 31.3   | 14.4   | 793  | 0.7   |
|   | 11.8   | 11.5   | 30.2   | 177  | 28.6   | 14.5   | 727  | 0.7   |
| 449   | 11.8   | 11.4   | 27.8   | 160  | 26.5   | 14.4   | 665  | 0.7   |
| 413   | 11.7   | 11.3   | 25.4   | 144  | 24.6   | 14.4   | 605  | 0.7   |
| 364   | 11.9   | 11.2   | 23.0   | 126  | 21.9   | 14.4   | 543  | 0.8   |
| 325   | 11.9   | 11.1   | 20.6   | 110  | 19.7   | 14.4   | 483  | 0.8   |
| 287   | 12.1   | 11.1   | 18.7   | 96.5   | 17.5   | 14.4   | 436  | 0.8   |
| 911   | 11.8   | 13.7   | 66.4   | 435  | 53.2   | 12.4   | 1350   | 0.7   |
|   |  |  |  |  |  |  |  | 0.7   |
|   |  |  |  |  |  |  |  | 0.8   |
|   |  |  |  |  |  |  |  | 0.8   |
|   |  |  |  |  |  |  |  | 0.8   |
|   |  |  |  |  |  |  |  | 0.8   |
|   |  |  |  |  |  |  |  | 0.8   |
|   |  |  |  |  |  |  |  | 0.8   |
| 394   | 12.6   | 12.7   | 33.7   | 165  | 25.9   | 12.3   | 621  | 0.8   |
|   |  | 911 11.8<br>812 11.9<br>726 12.1<br>656 12.0<br>686 12.2<br>527 12.3<br>478 12.4<br>432 12.6                 | 911 11.8 13.7<br>812 11.9 13.5<br>726 12.1 13.4<br>656 12.0 13.2<br>586 12.2 13.1<br>527 12.3 13.0<br>478 12.4 12.9<br>432 12.6 12.8 | 911 11.8 13.7 66.4<br>812 11.9 13.5 60.9<br>726 12.1 13.4 55.9<br>656 12.0 13.2 51.2<br>586 12.2 13.1 46.8<br>527 12.3 13.0 43.1<br>478 12.4 12.9 39.7<br>432 12.6 12.8 36.7 | 911 11.8 13.7 66.4 435<br>812 11.9 13.5 60.9 381<br>726 12.1 13.4 55.9 336<br>656 12.0 13.2 51.2 296<br>586 12.2 13.1 46.8 259<br>527 12.3 13.0 43.1 230<br>478 12.4 12.9 39.7 206<br>432 12.6 12.8 36.7 184 | 911 11.8 13.7 66.4 435 53.2<br>812 11.9 13.5 60.9 381 48.3<br>726 12.1 13.4 55.9 336 44.0<br>656 12.0 13.2 51.2 296 40.5<br>586 12.2 13.1 46.8 259 36.7<br>527 12.3 13.0 43.1 230 33.5<br>478 12.4 12.9 39.7 206 30.8<br>432 12.6 12.8 36.7 184 28.1 | 911 11.8 13.7 66.4 435 53.2 12.4<br>812 11.9 13.5 60.9 381 48.3 12.4<br>726 12.1 13.4 55.9 336 44.0 12.4<br>656 12.0 13.2 51.2 296 40.5 12.4<br>586 12.2 13.1 46.8 259 36.7 12.4<br>527 12.3 13.0 43.1 230 33.5 12.4<br>478 12.4 12.9 39.7 296 30.8 12.3<br>432 12.6 12.8 36.7 184 28.1 12.3 | 911 11.8 13.7 66.4 435 53.2 12.4 1350<br>812 11.9 13.5 60.9 381 48.3 12.4 1210<br>726 12.1 13.4 55.9 336 44.0 12.4 1100<br>656 12.0 13.2 51.2 296 40.5 12.4 990<br>586 12.2 13.1 46.8 259 36.7 12.4 894<br>527 12.3 13.0 43.1 230 33.5 12.4 815<br>478 12.4 12.9 39.7 206 30.8 12.3 742<br>432 12.6 12.8 36.7 184 28.1 12.3 680 |

Notes

Where  $\mathcal{I}$  is the span in feet:

Total allowable uniform load in kips  $= W_x/L$ 

End reaction in kips  $= W_x/2L$ 

Midspan deflection in inches =  $D_c \times L^2 / 1000$ 

For unbraced lengths greater than  $L_{\rm c}$  and less than  $L_{\rm p}$ , multiply the constants  $W_{\rm c}$  and  $D_{\rm c}$  by the ratio 22/Iwhere  $F_L = 24 \text{ km}$ 

 $F_y = 36 \text{ ksi}$   $F_y = 36 \text{ ksi}$ 

#### **BEAMS**

#### 40" Wide flange and tailor-made beams Uniform load constants for beams laterally supported

| N <sub>e</sub> | S  | n   |                   |         |   |          |   |       |   |   |   |   |   |
|----------------|--|---|-------------------|---------|---|----------|---|-------|---|---|---|---|---|
| -              | -  |   | Shane             | Wc      | V   | $L_v$    | $L_c$   | $L_u$ | R   | $R_i$   | $N_e$   | S   | $D_c$   |
|                | 111,3  | In./Ft.2  | Shape             | Kip-ft. | Kip   | Ft.      | Ft.   | Ft.   | Kip   | Kip   | In.   | In.3  | In./Ft.   |
| 14.6           | 1870   | 0.70  | WELLOT 11 TOS     | 05460   | 000   | 10.0     | 10.   | 70.0  | 410   | 50.   |   |   |   |
| 14.5           | 1680   |   |                   |         |   |          |   |       |   |   |   |   | 0.76  |
| 14.5           |  |   |                   |         |   |          |   |       |   |   |   |   | 0.78  |
| 14.5           |  |   |                   |         |   |          |   |       |   |   |   |   | 0.79  |
| 14.5           |  |   |                   |         |   |          |   |       |   |   |   |   | 0.80  |
| 14.5           |  |   |                   |         |   |          |   |       |   |   |   |   | 0.82  |
| 14.5           |  |   |                   |         |   |          |   |       |   |   |   |   | 0.83  |
| 14.4           |  | 1000  |                   |         |   |          |   |       |   |   |   |   | 0.84  |
| 14.4           |  |   |                   |         |   |          |   |       |   |   |   |   | 0.85  |
|                |  |   |                   |         |   |          |   |       |   |   |   |   | 0.86  |
| - 100          | 140  | 0.79  |                   |         |   |          |   |       |   |   |   |   | 0.87  |
| 146            | 1/20   | 0.70  |                   |         |   |          |   |       |   |   |   |   | 0.87  |
|                |  |   | 194               | 8900    | 304   | 14.7     | 14.8  | 31.0  | 113   | 20.3  | 12.9  | 556   | 0.88  |
|                |  |   |                   |         |   |          |   |       |   |   |   |   |   |
|                |  |   |                   |         |   |          |   |       |   |   |   |   | 0.76  |
|                |  |   |                   |         |   |          |   |       |   |   |   |   | 0.78  |
|                |  | 1   |                   |         |   |          |   |       |   |   |   |   | 0.79  |
|                |  |   |                   |         |   |          |   |       |   |   |   |   | 0.80  |
|                |  |   | 302               | 13000   |   | 10.8     |   | 40.7  |   | 37.3  |   |   | 0.82  |
|                |  |   | 271               |         |   |          |   |       |   |   |   |   | 0.83  |
|                |  |   | 247               | 10600   | 485   | 10.9     | 11.1  | 33.9  | 192   | 30.8  | 13.0  | 662   | 0.84  |
|                |  |   | 221               | 9480    | 428   | 11.1     | 11.0  | 30.7  | 167   | 27.5  | 13.0  |   | 0.85  |
|                |  |   | 201               | 8640    | 390   | 11.1     | 10.9  | 28.1  | 151   | 25.4  | 12.9  | 540   | 0.86  |
|                |  |   | 182               | 7810    | 349   | 11.2     | 10.8  | 25.6  | 132   | 22.9  | 12.9  | 488   | 0.87  |
| 14.4           | 436  | 0.81  | 159               | 6780    | 304   | 11.2     | 10.7  | 22.4  | 113   | 20.3  | 12.9  | 424   | 0.88  |
|                |  |   | 143               | 6120    | 269   | 11.4     | 10.6  | 20.4  | 98.4  | 18.1  |   |   | 0.89  |
| 12.4           | 1350   |   | 129               | 5510    | 243   | 11.4     | 10.6  | 18.4  | 87.5  | 16.5  | 12.9  | 345   | 0.90  |
| 12.4           |  |   |                   |         | F 4/8   | 15 15 15 |   |       | 1 1 1 2 3   |   |   |   |   |
| 12.4           | 1100:  |   | WTM 26 × 12 × 473 | 19800   | 858   | 11.5     | 13.8  | 70.7  | 435   | 53.2  | 11.4  | 1240  | 0.82  |
| 12.4           | 990  |   | 427               | 17900   | 763   | 11.7     | 13.6  | 65.0  | 381   | 48.3  | 11.4  | 1120  | 0.84  |
| 12.4           | 894  |   | 387               | 16200   | 682   | 11.9     | 13.4  | 59.8  | 333   | 44.0  | 11.4  | 1010  | 0.85  |
| 12.4           | 815  |   | 351               | 14500   | 616   | 11.8     | 13.3  | 54.7  | 296   | 40.5  | 11.4  | 909   | 0.87  |
| 12.3           | 742  | 200   | 317               | 13100   | 549   | 11.9     | 13.1  | 50.1  | 259   | 36.7  | 11.4  | 821   | 0.89  |
| 12.3           | 680  | 0.86  | 289               | 12000   | 494   | 12.2     | 13.0  | 46.2  | 230   | 33.5  | 11.4  | 748   | 0.90  |
| 12.3           | 621  | 0.87 -  | 264               | 10900   | 447   | 12.2     | 12.9  | 42.6  | 206   | 30.8  | 11.3  | 680   | 0.91  |
|                |  |   | 241               | 9980    | 403   | 12.4     | 12.8  | 39.4  | 183   | 28.1  | 11.4  | 624   | 0.92  |
|                |  |   | 221               | 9110    | 368   | 12.4     | 12.7  | 36.3  | 165   | 25.9  | 11.3  | 569   | 0.93  |
|                |  |   |                   |         |   | 1000     |   |       |   |   | S 140   |   |   |
|                |  |   |                   |         |   |          |   |       |   |   |   |   |   |
|                |  |   |                   |         |   |          |   |       |   |   |   |   |   |
|                |  |   |                   |         |   |          |   |       |   |   |   |   |   |
|                | 14.6<br>14.5<br>14.5<br>14.5<br>14.5<br>14.5<br>14.5<br>14.5<br>14.5 | In. In.3  14.6 1870 14.5 1680 14.5 1530 14.5 1380 14.5 1140 14.5 1140 14.5 1030 14.5 1140 14.5 1250 14.5 1170 14.4 928 14.4 746  14.5 1290 14.5 1770 14.5 1060 14.5 955 14.5 871 14.4 793 14.5 955 14.4 665 14.4 665 14.4 436 12.4 1210 12.4 1210 12.4 990 12.4 894 12.4 815 12.3 680 | In.               | Name    | No.   In.   In. | Name     | No.   No. | In    | $ \begin{array}{ c c c c c c c c c c c c c c c c c c c$ | No.   In.   In. | No.   No. | No.   No. | No.   No. |

Notes

Where L is the span in feet:

Total allowable uniform load in kips =  $W_c/L$ .

End reaction in kips =  $W_c/2L$ .

Midspan deflection in inches =  $D_c \times L^2 / 1000$ .

For unbraced lengths greater than  $L_c$  and less than  $L_u$ , multiply the constants  $W_c$  and  $D_c$  by the ratio 22/ $F_b$ , where  $F_b = 24 \text{ ksi.}$ 

 $\overline{V}_c$  and  $D_c$  by the ratio 22/F

Shape

# I

### 40" Wide flange and tailor-made beams Uniform load constants for beams laterally supported

| 841<br>758<br>678<br>613<br>547<br>492<br>446<br>394<br>360<br>322<br>297<br>273<br>795<br>713<br>637<br>576<br>513<br>459<br>408<br>366<br>330<br>297 | Ft.  12.2 12.3 12.5 12.6 12.8 12.9 13.1 13.2 13.2 13.2 11.3 11.4 11.5 11.6 11.7 11.8 12.0 12.0 12.1                                  | Ft.  14.9 14.7 14.6 14.4 14.3 14.1 14.0 13.9 13.8 13.7 13.6 13.8 13.6 13.8 13.2 13.0 12.9 12.8                                       | Ft.  78.0 72.6 66.9 61.5 56.4 52.2 43.8 40.4 31.7 75.1 69.2 63.7 59.1 54.2 49.3 45.4 41.2  | 416<br>370<br>323<br>287<br>252<br>223<br>200<br>174<br>156<br>138<br>126<br>114<br>434<br>384<br>338<br>304<br>264<br>234<br>206  | 53.2<br>48.9<br>44.5<br>41.0<br>37.3<br>34.0<br>31.3<br>28.1<br>25.9<br>20.3<br>52.6<br>48.3<br>44.0<br>40.5<br>36.7<br>33.5<br>36.7<br>33.5<br>30.2   | In.  11.5 11.5 11.5 11.4 11.4 11.4 11.4 11  | 1290<br>1170<br>1060<br>957<br>864<br>789<br>718<br>644<br>588<br>531<br>491<br>450<br>1120<br>1010<br>913<br>833<br>752<br>675  | 0.8. 0.9. 0.9. 0.9. 0.9. 0.9. 0.9. 0.9.  |
|--|--|--|--|--|--|---|--|--|
| 758<br>678<br>613<br>547<br>492<br>446<br>394<br>360<br>322<br>297<br>273<br>795<br>713<br>637<br>576<br>513<br>459<br>408<br>366<br>330               | 12.3<br>12.5<br>12.5<br>12.6<br>12.8<br>12.9<br>13.1<br>13.2<br>13.2<br>13.2<br>11.3<br>11.4<br>11.5<br>11.6<br>11.7<br>11.8<br>12.0 | 14.7<br>14.6<br>14.4<br>14.3<br>14.1<br>14.0<br>13.9<br>13.8<br>13.7<br>13.6<br>13.6<br>13.4<br>13.3<br>13.2<br>13.0<br>12.9         | 72.6<br>66.9<br>61.5<br>56.4<br>52.2<br>48.2<br>43.8<br>40.4<br>36.8<br>34.4<br>31.7<br>75.1<br>69.2<br>63.7<br>59.1<br>54.2<br>49.3<br>45.4 | 370<br>323<br>287<br>252<br>223<br>200<br>174<br>156<br>138<br>126<br>114<br>434<br>384<br>338<br>304<br>264<br>234  | 48.9<br>44.5<br>41.0<br>37.3<br>34.0<br>31.3<br>28.1<br>25.9<br>23.5<br>21.9<br>20.3<br>52.6<br>48.3<br>44.0<br>536.7<br>33.5  | 11.5<br>11.5<br>11.4<br>11.4<br>11.4<br>11.4<br>11.3<br>11.3<br>11.3<br>10.3<br>10.3<br>10.3<br>10.3<br>10.2  | 1170<br>1060<br>957<br>864<br>789<br>718<br>644<br>588<br>531<br>491<br>450<br>1120<br>1010<br>913<br>833<br>752   | 0.8<br>0.8<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9   |
| 758<br>678<br>613<br>547<br>492<br>446<br>394<br>360<br>322<br>297<br>273<br>795<br>713<br>637<br>576<br>513<br>459<br>408<br>366<br>330               | 12.3<br>12.5<br>12.5<br>12.6<br>12.8<br>12.9<br>13.1<br>13.2<br>13.2<br>13.2<br>11.3<br>11.4<br>11.5<br>11.6<br>11.7<br>11.8<br>12.0 | 14.7<br>14.6<br>14.4<br>14.3<br>14.1<br>14.0<br>13.9<br>13.8<br>13.7<br>13.6<br>13.6<br>13.4<br>13.3<br>13.2<br>13.0<br>12.9         | 72.6<br>66.9<br>61.5<br>56.4<br>52.2<br>48.2<br>43.8<br>40.4<br>36.8<br>34.4<br>31.7<br>75.1<br>69.2<br>63.7<br>59.1<br>54.2<br>49.3<br>45.4 | 370<br>323<br>287<br>252<br>223<br>200<br>174<br>156<br>138<br>126<br>114<br>434<br>384<br>338<br>304<br>264<br>234  | 48.9<br>44.5<br>41.0<br>37.3<br>34.0<br>31.3<br>28.1<br>25.9<br>23.5<br>21.9<br>20.3<br>52.6<br>48.3<br>44.0<br>536.7<br>33.5  | 11.5<br>11.5<br>11.4<br>11.4<br>11.4<br>11.4<br>11.3<br>11.3<br>11.3<br>10.3<br>10.3<br>10.3<br>10.3<br>10.2  | 1170<br>1060<br>957<br>864<br>789<br>718<br>644<br>588<br>531<br>491<br>450<br>1120<br>1010<br>913<br>833<br>752   | 0.8<br>0.8<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9<br>0.9   |
| 678<br>613<br>547<br>492<br>446<br>394<br>360<br>322<br>297<br>273<br>795<br>713<br>637<br>576<br>513<br>459<br>408<br>366<br>330                      | 12.5<br>12.5<br>12.6<br>12.8<br>12.9<br>13.1<br>13.1<br>13.2<br>13.2<br>11.3<br>11.4<br>11.5<br>11.6<br>11.7<br>11.8<br>12.0         | 14.6<br>14.4<br>14.3<br>14.1<br>14.0<br>13.9<br>13.8<br>13.7<br>13.6<br>13.8<br>13.6<br>13.4<br>13.3<br>13.2<br>13.0<br>12.9<br>12.8 | 66.9<br>61.5<br>56.4<br>52.2<br>48.2<br>43.8<br>40.4<br>36.8<br>34.4<br>31.7<br>75.1<br>69.2<br>63.7<br>59.1<br>54.2<br>49.3<br>45.4         | 323<br>287<br>252<br>223<br>200<br>174<br>156<br>138<br>126<br>114<br>434<br>384<br>338<br>304<br>264<br>234   | 44.5<br>41.0<br>37.3<br>34.0<br>31.3<br>28.1<br>25.9<br>23.5<br>21.9<br>20.3<br>52.6<br>48.3<br>44.0<br>536.7<br>33.5  | 11.5<br>11.4<br>11.4<br>11.4<br>11.4<br>11.4<br>11.3<br>11.3<br>11.3  | 1060<br>957<br>864<br>789<br>718<br>644<br>588<br>531<br>491<br>450<br>1120<br>1010<br>913<br>833<br>752   | 0.8<br>0.2<br>0.2<br>0.2<br>0.2<br>0.2<br>0.2<br>0.2<br>0.3<br>0.2<br>0.3<br>0.3<br>0.3<br>0.3<br>0.3<br>0.3<br>0.3<br>0.3<br>0.3<br>0.3   |
| 613<br>547<br>492<br>446<br>394<br>360<br>322<br>297<br>273<br>795<br>713<br>637<br>576<br>513<br>459<br>408<br>366<br>330                             | 12.5<br>12.6<br>12.8<br>12.9<br>13.1<br>13.1<br>13.2<br>13.2<br>13.2<br>11.3<br>11.4<br>11.5<br>11.6<br>11.7<br>11.8<br>12.0         | 14.4<br>14.3<br>14.1<br>14.0<br>13.9<br>13.8<br>13.7<br>13.6<br>13.6<br>13.4<br>13.3<br>13.2<br>13.0<br>12.9<br>12.8                 | 61.5<br>56.4<br>52.2<br>48.2<br>43.8<br>40.4<br>36.8<br>34.4<br>31.7<br>75.1<br>69.2<br>63.7<br>59.1<br>54.2<br>49.3<br>45.4                 | 287<br>252<br>223<br>200<br>174<br>156<br>138<br>126<br>114<br>434<br>384<br>338<br>304<br>264<br>234  | 41.0<br>37.3<br>34.0<br>31.3<br>28.1<br>25.9<br>23.5<br>21.9<br>20.3<br>52.6<br>48.3<br>44.0<br>40.5<br>36.7<br>33.5   | 11.4<br>11.4<br>11.4<br>11.4<br>11.4<br>11.3<br>11.3<br>11.3  | 957<br>864<br>789<br>718<br>644<br>588<br>531<br>491<br>450<br>1120<br>1010<br>913<br>833<br>752   | 0.5<br>0.5<br>0.5<br>0.5<br>0.5<br>0.5<br>0.5<br>0.5<br>0.5<br>0.5   |
| 547<br>492<br>446<br>394<br>360<br>322<br>297<br>273<br>795<br>713<br>637<br>576<br>513<br>459<br>408<br>366<br>330                                    | 12.6<br>12.8<br>12.9<br>13.1<br>13.1<br>13.2<br>13.2<br>13.2<br>11.3<br>11.4<br>11.5<br>11.6<br>11.7<br>11.8                         | 14.3<br>14.1<br>14.0<br>13.9<br>13.8<br>13.7<br>13.6<br>13.6<br>13.4<br>13.3<br>13.2<br>13.0<br>12.9<br>12.8                         | 56.4<br>52.2<br>48.2<br>43.8<br>40.4<br>36.8<br>34.4<br>31.7<br>75.1<br>69.2<br>63.7<br>59.1<br>54.2<br>49.3<br>45.4                         | 252<br>223<br>200<br>174<br>156<br>138<br>126<br>114<br>434<br>384<br>338<br>304<br>264<br>234   | 37.3<br>34.0<br>31.3<br>28.1<br>25.9<br>23.5<br>21.9<br>20.3<br>52.6<br>48.3<br>44.0<br>40.5<br>36.7<br>33.5   | 11.4<br>11.4<br>11.4<br>11.4<br>11.3<br>11.3<br>11.3<br>10.3<br>10.3<br>10.3<br>10.3<br>10.2  | 864<br>789<br>718<br>644<br>588<br>531<br>491<br>450<br>1120<br>1010<br>913<br>833<br>752  | 0.5<br>0.5<br>0.5<br>0.5<br>0.5<br>0.5<br>0.5<br>0.5<br>0.5<br>0.5   |
| 492<br>446<br>394<br>360<br>322<br>297<br>273<br>795<br>713<br>637<br>576<br>513<br>459<br>408<br>366<br>330   | 12.8<br>12.9<br>13.1<br>13.1<br>13.2<br>13.2<br>13.2<br>11.3<br>11.4<br>11.5<br>11.6<br>11.7<br>11.8<br>12.0                         | 14.1<br>14.0<br>13.9<br>13.8<br>13.7<br>13.6<br>13.6<br>13.4<br>13.3<br>13.2<br>13.0<br>12.9<br>12.8                                 | 52.2<br>48.2<br>43.8<br>40.4<br>36.8<br>34.4<br>31.7<br>75.1<br>69.2<br>63.7<br>59.1<br>54.2<br>49.3<br>45.4                                 | 223<br>200<br>174<br>156<br>138<br>126<br>114<br>434<br>384<br>384<br>304<br>264<br>234  | 34.0<br>31.3<br>28.1<br>25.9<br>23.5<br>21.9<br>20.3<br>52.6<br>48.3<br>44.0<br>40.5<br>36.7<br>33.5   | 11.4<br>11.4<br>11.4<br>11.3<br>11.3<br>11.3<br>10.3<br>10.3<br>10.3<br>10.2<br>10.3  | 789<br>718<br>644<br>588<br>531<br>491<br>450<br>1120<br>1010<br>913<br>833<br>752   | 0.<br>0.<br>0.<br>0.<br>0.<br>0.<br>0.   |
| 446<br>394<br>360<br>322<br>297<br>273<br>795<br>713<br>637<br>576<br>513<br>459<br>408<br>366<br>330  | 12.9<br>13.1<br>13.1<br>13.2<br>13.2<br>13.2<br>11.3<br>11.4<br>11.5<br>11.6<br>11.7<br>11.8<br>12.0<br>12.0                         | 14.0<br>13.9<br>13.8<br>13.7<br>13.6<br>13.6<br>13.4<br>13.3<br>13.2<br>13.0<br>12.9<br>12.8   | 48.2<br>43.8<br>40.4<br>36.8<br>34.4<br>31.7<br>75.1<br>69.2<br>63.7<br>59.1<br>54.2<br>49.3<br>45.4   | 200<br>174<br>156<br>138<br>126<br>114<br>434<br>384<br>338<br>304<br>264<br>234   | 31.3<br>28.1<br>25.9<br>23.5<br>21.9<br>20.3<br>52.6<br>48.3<br>44.0<br>40.5<br>36.7<br>33.5   | 11.4<br>11.4<br>11.3<br>11.3<br>11.3<br>10.3<br>10.3<br>10.3<br>10.2<br>10.3  | 718<br>644<br>588<br>531<br>491<br>450<br>1120<br>1010<br>913<br>833<br>752  | 0.<br>0.<br>0.<br>0.<br>0.<br>0.   |
| 394<br>360<br>322<br>297<br>273<br>795<br>713<br>637<br>576<br>513<br>459<br>408<br>366<br>330   | 13.1<br>13.1<br>13.2<br>13.2<br>13.2<br>11.3<br>11.4<br>11.5<br>11.6<br>11.7<br>11.8<br>12.0<br>12.0                                 | 13.9<br>13.8<br>13.7<br>13.7<br>13.6<br>13.8<br>13.6<br>13.4<br>13.3<br>13.2<br>13.0<br>12.9<br>12.8                                 | 43.8<br>40.4<br>36.8<br>34.4<br>31.7<br>75.1<br>69.2<br>63.7<br>59.1<br>54.2<br>49.3<br>45.4   | 174<br>156<br>138<br>126<br>114<br>434<br>384<br>338<br>304<br>264<br>234  | 28.1<br>25.9<br>23.5<br>21.9<br>20.3<br>52.6<br>48.3<br>44.0<br>40.5<br>36.7<br>33.5   | 11.4<br>11.3<br>11.3<br>11.3<br>10.3<br>10.3<br>10.3<br>10.2<br>10.3  | 644<br>588<br>531<br>491<br>450<br>1120<br>1010<br>913<br>833<br>752   | 0.<br>0.<br>0.<br>0.<br>0.<br>0.   |
| 360<br>322<br>297<br>273<br>795<br>713<br>637<br>576<br>513<br>459<br>408<br>366<br>330  | 13.1<br>13.2<br>13.2<br>13.2<br>11.3<br>11.4<br>11.5<br>11.6<br>11.7<br>11.8<br>12.0<br>12.0   | 13.8<br>13.7<br>13.7<br>13.6<br>13.8<br>13.6<br>13.4<br>13.3<br>13.2<br>13.0<br>12.9<br>12.8   | 40.4<br>36.8<br>34.4<br>31.7<br>75.1<br>69.2<br>63.7<br>59.1<br>54.2<br>49.3<br>45.4   | 156<br>138<br>126<br>114<br>434<br>384<br>338<br>304<br>264<br>234   | 25.9<br>23.5<br>21.9<br>20.3<br>52.6<br>48.3<br>44.0<br>40.5<br>36.7<br>33.5   | 11.4<br>11.3<br>11.3<br>11.3<br>10.3<br>10.3<br>10.3<br>10.2<br>10.3  | 588<br>531<br>491<br>450<br>1120<br>1010<br>913<br>833<br>752  | 0.<br>0.<br>0.<br>0.<br>0.<br>0.   |
| 322<br>297<br>273<br>795<br>713<br>637<br>576<br>513<br>459<br>408<br>366<br>330   | 13.2<br>13.2<br>13.2<br>11.3<br>11.4<br>11.5<br>11.6<br>11.7<br>11.8<br>12.0<br>12.0   | 13.7<br>13.6<br>13.8<br>13.6<br>13.4<br>13.3<br>13.2<br>13.0<br>12.9<br>12.8   | 36.8<br>34.4<br>31.7<br>75.1<br>69.2<br>63.7<br>59.1<br>54.2<br>49.3<br>45.4   | 138<br>126<br>114<br>434<br>384<br>338<br>304<br>264<br>234  | 23.5<br>21.9<br>20.3<br>52.6<br>48.3<br>44.0<br>40.5<br>36.7<br>33.5   | 11.3<br>11.3<br>11.3<br>10.3<br>10.3<br>10.3<br>10.2<br>10.3  | 531<br>491<br>450<br>1120<br>1010<br>913<br>833<br>752   | 0.<br>0.<br>0.<br>0.<br>0.   |
| 297<br>273<br>795<br>713<br>637<br>576<br>513<br>459<br>408<br>366<br>330  | 13.2<br>13.2<br>11.3<br>11.4<br>11.5<br>11.6<br>11.7<br>11.8<br>12.0<br>12.0   | 13.7<br>13.6<br>13.8<br>13.6<br>13.4<br>13.3<br>13.2<br>13.0<br>12.9<br>12.8   | 34.4<br>31.7<br>75.1<br>69.2<br>63.7<br>59.1<br>54.2<br>49.3<br>45.4   | 126<br>114<br>434<br>384<br>338<br>304<br>264<br>234   | 21.9<br>20.3<br>52.6<br>48.3<br>44.0<br>40.5<br>36.7<br>33.5   | 11.3<br>11.3<br>10.3<br>10.3<br>10.3<br>10.2<br>10.3  | 491<br>450<br>1120<br>1010<br>913<br>833<br>752  | 0.<br>0.<br>0.<br>0.<br>0.   |
| 795<br>713<br>637<br>576<br>513<br>459<br>408<br>366<br>330  | 13.2<br>11.3<br>11.4<br>11.5<br>11.6<br>11.7<br>11.8<br>12.0<br>12.0   | 13.6<br>13.8<br>13.6<br>13.4<br>13.3<br>13.2<br>13.0<br>12.9<br>12.8   | 31.7<br>75.1<br>69.2<br>63.7<br>59.1<br>54.2<br>49.3<br>45.4   | 114<br>434<br>384<br>338<br>304<br>264<br>234  | 20.3<br>52.6<br>48.3<br>44.0<br>40.5<br>36.7<br>33.5   | 11.3<br>10.3<br>10.3<br>10.3<br>10.2<br>10.3  | 450<br>1120<br>1010<br>913<br>833<br>752   | 0.<br>0.<br>0.<br>0.<br>0.   |
| 795<br>713<br>637<br>576<br>513<br>459<br>408<br>366<br>330  | 11.3<br>11.4<br>11.5<br>11.6<br>11.7<br>11.8<br>12.0<br>12.0   | 13.8<br>13.6<br>13.4<br>13.3<br>13.2<br>13.0<br>12.9<br>12.8   | 75.1<br>69.2<br>63.7<br>59.1<br>54.2<br>49.3<br>45.4   | 434<br>384<br>338<br>304<br>264<br>234   | 52.6<br>48.3<br>44.0<br>40.5<br>36.7<br>33.5   | 10.3<br>10.3<br>10.3<br>10.2<br>10.3  | 1120<br>1010<br>913<br>833<br>752  | 0.   |
| 713<br>637<br>576<br>513<br>459<br>408<br>366<br>330   | 11.4<br>11.5<br>11.6<br>11.7<br>11.8<br>12.0<br>12.0   | 13.6<br>13.4<br>13.3<br>13.2<br>13.0<br>12.9<br>12.8   | 69.2<br>63.7<br>59.1<br>54.2<br>49.3<br>45.4   | 384<br>338<br>304<br>264<br>234  | 48.3<br>44.0<br>40.5<br>36.7<br>33.5   | 10.3<br>10.3<br>10.2<br>10.3  | 1010<br>913<br>833<br>752  | 0.   |
| 637<br>576<br>513<br>459<br>408<br>366<br>330  | 11.5<br>11.6<br>11.7<br>11.8<br>12.0<br>12.0   | 13.4<br>13.3<br>13.2<br>13.0<br>12.9<br>12.8   | 63.7<br>59.1<br>54.2<br>49.3<br>45.4   | 338<br>304<br>264<br>234   | 44.0<br>40.5<br>36.7<br>33.5   | 10.3<br>10.2<br>10.3  | 913<br>833<br>752  | 0.   |
| 576<br>513<br>459<br>408<br>366<br>330   | 11.6<br>11.7<br>11.8<br>12.0<br>12.0   | 13.3<br>13.2<br>13.0<br>12.9<br>12.8   | 59.1<br>54.2<br>49.3<br>45.4   | 304<br>264<br>234  | 40.5<br>36.7<br>33.5   | 10.2<br>10.3  | 833<br>752   | 0.   |
| 513<br>459<br>408<br>366<br>330  | 11.7<br>11.8<br>12.0<br>12.0   | 13.2<br>13.0<br>12.9<br>12.8   | 54.2<br>49.3<br>45.4   | 264<br>234   | 36.7<br>33.5   | 10.3  | 752  | 0.   |
| 459<br>408<br>366<br>330   | 11.8<br>12.0<br>12.0   | 13.0<br>12.9<br>12.8   | 49.3<br>45.4   | 234  | 33.5   |   |  |  |
| 408<br>366<br>330  | 12.0<br>12.0   | 12.9<br>12.8   | 45.4   |  |  | 10.2  | 675  |  |
| 366<br>330   | 12.0   | 12.8   | 1  | 206  | 30.2   |   |  | 0  |
| 330  |  |  | 41.2   |  | 30.2   | 10.2  | 612  | 0  |
|  | 12.1   | 40.7   |  | 181  | 27.5   | 10.2  | 550  | 1.   |
| 297  |  | 12.7   | 37.8   | 162  | 25.1   | 10.2  | 499  | 1.   |
|  | 12.2   | 12.6   | 34.6   | 143  | 22.9   | 10.2  | 453  | 1.   |
| 727  | 9.4  | 10.8   | 51.5   | 351  | 47.3   | 11.5  | 857  | 0.   |
| 648  | 9.5  | 10.6   | 47.1   | 306  | 42.9   | 11.5  | 771  | 0.   |
| 585  | 9.6  | 10.5   | 43.5   | 273  | 39.4   | 11.4  | 701  | 0.   |
| 528  | 9.6  | 10.3   | 39.8   | 242  | 36.2   | 11.4  | 633  | 0.   |
| 474  | 9.7  | 10.2   |  |  |  |   |  | 0  |
| 429  | 9.7  |  |  |  |  | 1   |  | 0.   |
|  |  |  |  |  |  |   |  | 0.   |
|  |  |  |  |  |  | 1   |  | 0.   |
|  |  |  |  |  |  |   |  | 0.   |
|  |  |  |  |  |  |   |  | 0.   |
|  |  |  |  |  |  |   |  | 0.   |
|  |  |  |  |  |  |   |  | 1.   |
|  |  |  |  |  |  |   |  | 1.   |
|  |  |  |  |  |  |   |  |  |
|  | 528  | 528 9.6<br>474 9.7<br>429 9.7<br>386 9.8<br>351 9.8<br>314 9.9<br>281 10.1<br>217 10.1   | 528 9.6 10.3<br>474 9.7 10.2<br>429 9.7 10.1<br>386 9.8 10.0<br>351 9.8 9.9<br>314 9.9 9.8<br>281 9.9 9.7<br>241 10.1 9.6                    | 528 9.6 10.3 39.8<br>474 9.7 10.2 36.5<br>429 9.7 10.1 33.5<br>386 9.8 10.0 30.9<br>351 9.8 9.9 28.3<br>314 9.9 9.8 25.8<br>281 9.9 9.7 23.3<br>241 10.1 9.6 20.6<br>217 10.1 9.6 18.6 | 528         9.6         10.3         39.8         242           474         9.7         10.2         36.5         214           429         9.7         10.1         33.5         191           386         9.8         10.0         30.9         169           351         9.8         9.9         28.3         152           314         9.9         9.8         25.8         133           281         9.9         9.7         23.3         118           241         10.1         9.6         20.6         99.5           217         10.1         9.6         18.6         88.5 | 528         9.6         10.3         39.8         242         36.2           474         9.7         10.2         36.5         214         32.9           429         9.7         10.1         33.5         191         30.2           386         9.8         10.0         30.9         169         27.5           351         9.8         9.9         28.3         152         25.4           314         9.9         9.8         25.8         133         22.9           281         9.9         9.7         23.3         118         20.8           241         10.1         9.6         20.6         99.5         18.1           217         10.1         9.6         18.6         88.5         16.5 | 528         9.6         10.3         39.8         242         36.2         11.4           474         9.7         10.2         36.5         214         32.9         11.4           429         9.7         10.1         33.5         191         30.2         11.4           386         9.8         10.0         30.9         169         27.5         11.4           351         9.8         9.9         28.3         152         25.4         11.3           314         9.9         9.8         25.8         133         22.9         11.4           281         9.9         9.7         23.3         118         20.8         11.3           241         10.1         9.6         20.6         99.5         18.1         11.3           217         10.1         9.6         18.6         88.5         16.5         11.3 | 528         9.6         10.3         39.8         242         36.2         11.4         633           474         9.7         10.2         36.5         214         32.9         11.4         574           429         9.7         10.1         33.5         191         30.2         11.4         574           386         9.8         10.0         30.9         169         27.5         11.4         475           351         9.8         9.9         28.3         152         25.4         11.3         432           314         9.9         9.8         25.8         133         22.9         11.4         390           281         9.9         9.7         23.3         118         20.8         11.3         348           241         10.1         9.6         20.6         99.5         18.1         11.3         305           217         10.1         9.6         18.6         88.5         16.5         11.3         275 |

Notes:

Where L is the span in feet:

Total allowable uniform load in kips  $= W_c/L$ .

End reaction in kips =  $W_c/2L$ .

Midspan deflection in inches =  $D_c \times L^2 / 1000$ .

For unbraced lengths greater than  $L_c$  and less than  $L_\mu$ , multiply the constants  $W_c$  and  $D_c$  by the ratio 22  $/F_c$  where  $F_b=24$  ksi.



ides:

Pere L is the span in Total allowable uni End reaction in kip Midspan deflection

where  $F_{ij} = 24 \text{ ksi}$ .

 $F_y = 36 \text{ ksi}$   $F_y = 36 \text{ ksi}$ 

#### **BEAMS**

### 40" Wide flange and tailor-made beams Uniform load constants for beams laterally supported

| N <sub>e</sub> | S      | Dc       | Chann                     | Wc           | V   | Lv   | Lc   | $L_u$ | R    | $R_i$ | Ne   | S    | $D_c$    |
|----------------|--------|----------|---------------------------|--------------|-----|------|------|-------|------|-------|------|------|----------|
| ln.            | ln.3   | In./Ft.2 | Shape                     | Kip-ft.      | Kip | Ft.  | Ft.  | Ft.   | Kip  | Kip   | In.  | In.3 | In./Ft.2 |
| 11.5           | 1290   | 0.84     | WTM 22 × 12 × 395         | 14300        | 647 | 11.1 | 13.6 | 73.1  | 369  | 47.3  | 9.4  | 895  | 0.07     |
| 11.5           | 1170   | 0.85     | 357                       | 12900        | 575 | 11.2 | 13.4 | 67.3  | 325  | 42.9  | 9.4  | 807  | 0.97     |
| 11.5           | 1060   | 0.87     | 326                       | 11700        | 518 | 11.3 | 13.3 | 62.4  | 288  | 39.4  | 9.3  | 734  |          |
| 11.4           | 957    | 0.89     | 295                       | 10600        | 466 | 11.4 | 13.2 | 57.3  | 256  | 36.2  | 9.3  | 663  | 1.0      |
| 11.4           | 864    | 0.90     | 269                       | 9650         | 418 | 11.5 | 13.0 | 52.9  | 226  | 32.9  | 9.3  | 603  | 1.0      |
| 11.4           | 789    | 0.92     | 245                       | 8770         | 377 | 11.6 | 12.9 | 48.7  | 202  |       |      |      |          |
| 11.4           | 718    | 0.93     | 223                       | 8010         | 339 | 11.8 | 12.8 |       | 181  | 30.2  | 9.3  | 548  | 1.1      |
| 11.4           | 644    | 0.94     | 204                       | 7300         | 308 | 11.8 | 12.7 | 45.1  | 162  | 27.5  | 9.2  | 501  | 1.1      |
| 11.4           | 588    | 0.95     | 204                       | 7300         | 300 | 11.0 | 12.7 | 41.5  | 102  | 25.4  | 9.3  | 456  | 1.1      |
| 11.3           | 531    | 0.97     | WTM 00 0 5 026            | 9000         | 468 | 0.0  | 0.5  | 20.0  | 044  | 05.4  | 0.0  | 544  | 0.00     |
| 11.3           | 491    | 0.97     | WTM 22 × 8.5 × 236<br>216 | 8220<br>7500 | 425 | 8.8  | 9.5  | 39.2  | 244  | 35.1  | 9.9  | 514  | 0.99     |
| 11.3           | 450    | 0.98     |                           |              |     | 8.8  | 9.4  | 36.1  | 219  | 32.4  | 9.9  | 468  | 1.0      |
| 11.0           | 400    | 0.98     | 194                       | 6740         | 376 | 9.0  | 9.3  | 32.9  | 191  | 29.2  | 9.8  | 421  | 1.0      |
| 10.3           | 1120   | 0.88     | 178                       | 6160         | 344 | 9.0  | 9.2  | 30.3  | 172  | 27.0  | 9.9  | 385  | 1.0      |
| 10.3           | 1010   |          | 161                       | 5570         | 309 | 9.0  | 9.1  | 27.6  | 154  | 24.6  | 9.8  | 348  | 1.1      |
| 10.3           | 913    | 0.90     | 146                       | 5040         | 278 | 9.1  | 9.0  | 25.2  | 136  | 22.4  | 9.8  | 315  | 1.1      |
| 10.3           |        | 0.92     | 133                       | 4600         | 249 | 9.3  | 9.0  | 23.2  | 120  | 20.3  | 9.8  | 287  | 1.1      |
|                | 833    | 0.93     | 118                       | 4050         | 219 | 9.2  | 8.9  | 20.6  | 105  | 18.1  | 9.8  | 253  | 1.1      |
| 10.3           | 752    | 0.95     |                           |              |     |      |      |       |      |       |      |      |          |
| 10.2           | 675    | 0.97     | WTM 21 × 12.25 × 402      | 15000        | 648 | 11.6 | 14.1 | 74.7  | 344  | 46.7  | 10.0 | 937  | 0.95     |
| 10.2           | 612    | 0.98     | 364                       | 13500        | 583 | 11.6 | 14.0 | 68.7  | 306  | 42.9  | 10.0 | 846  | 0.97     |
| 10.2           | 550    | 1.0      | 333                       | 12300        | 526 | 11.7 | 13.9 | 63.7  | 271  | 39.4  | 10.0 | 769  | 0.99     |
| 10.2           | 499    | 1.0      | 300                       | 11100        | 466 | 11.9 | 13.7 | 58.3  | 236  | 35.6  | 10.0 | 692  | 1.0      |
| 10.2           | 453    | 1.0      | 275                       | 10100        | 424 | 11.9 | 13.6 | 54.2  | 214  | 32.9  | 9.9  | 632  | 1.0      |
|                |        |          | . 248                     | 9110         | 376 | 12.1 | 13.5 | 49.6  | 186  | 29.7  | 9.9  | 569  | 1.0      |
| 11.5           | 857    | 0.86     | 223                       | 8160         | 336 | 12.1 | 13.4 | 45.0  | 164  | 27.0  | 9.9  | 510  | 1.1      |
| 11.5           | 771    | 0.88     | 201                       | 7380         | 302 | 12.2 | 13.3 | 41.2  | 144  | 24.6  | 9.9  | 461  | 1.1      |
| 11.4           | 701    | 0.89     | 182                       | 6670         | 272 | 12.3 | 13.2 | 37.7  | 129  | 22.4  | 9.9  | 417  | 1.1      |
| 11.4           | 633 :- | 0.91     | 166                       | 6090         | 243 | 12.5 | 13.1 | 34.8  | 114  | 20.3  | 9.9  | 380  | 1.1      |
| 11.4           | 574    | 0.92     |                           |              |     |      |      |       |      |       |      |      |          |
| 11.4           | 521    | 0.93     | WTM 18 × 11 × 311         | 9980         | 489 | 10.2 | 12.7 | 68.2  | 285  | 41.0  | 8.5  | 624  | 1.1      |
| 11.4           | 475    | 0.95     | 283                       | 9030         | 440 | 10.2 | 12.6 | 63.0  | 253  | 37.8  | 8.5  | 564  | 1.1      |
| 11.3           | 432    | 0.96     | 258                       | 8220         | 396 | 10.4 | 12.4 | 58.4  | 225  | 34.6  | 8.4  | 514  | 1.2      |
| 11.4           | 390    | 0.97     | 234                       | 7450         | 352 | 10.6 | 12.3 | 54.0  | 196  | 31.3  | 8.5  | 466  | 1.2      |
| 11.3           | 348    | 0.98     | 211                       | 6700         | 316 | 10.6 | 12.2 | 49.4  | 174  | 28.6  | 8.5  | 419  | 1.2      |
|                | 305    | 0.99     | 192                       | 6090         | 281 | 10.8 | 12.1 | 45.6  | 154  | 25.9  | 8.4  | 380  | 1.2      |
| 11.3           | 275    | 1.0      | 175                       | 5510         | 257 | 10.7 | 12.0 | 41.8  | 138  | 24.0  | 8.4  | 344  | 1.2      |
| 11.3           | 245    | 1.0      | 158                       | 4960         | 230 | 10.8 | 11.9 | 38.2  | 123  | 21.9  | 8.4  | 310  | 1.3      |
| 11.3           | 240    | 1.0      | 143                       | 4510         | 205 | 11.0 | 11.8 | 35.2  | 108  | 19.7  | 8.4  | 282  | 1.3      |
|                |        |          | 130                       | 4090         | 186 | 11.0 | 11.8 | 32.2  | 97.2 | 18.1  | 8.4  | 256  | 1.3      |
|                |        |          |                           |              |     |      |      |       |      |       |      |      |          |
|                |        |          |                           |              |     |      |      |       |      |       |      |      |          |

Where L is the span in feet:

Total allowable uniform load in kips =  $W_c/L$ .

End reaction in kips =  $W_c/2L$ .

Midspan deflection in inches =  $D_c \times L^2 / 1000$ .

For unbraced lengths greater than  $L_c$  and less than  $L_u$ , multiply the constants  $W_c$  and  $D_c$  by the ratio 22/ $F_b$ . where  $F_b = 24 \text{ ksi.}$ 

 $_{c}$  and  $D_{c}$  by the ratio 22  $IF_{b}$ 

#### BEAMS

 $F_y = 50 \text{ ks}$ 

40" Wide flange and tailor-made beams Uniform load constants for beams laterally supported

| 29500 77<br>26800 6<br>24000 5<br>21600 5<br>18900 5 | 159<br>191<br>155  | Ft.<br>20.3<br>20.3<br>20.3 | Ft.<br>16.0<br>16.0 | Ft. 25.8 | Kip 226 | Kip  | in.  | in.8 | In./F |
|--|--------------------|-----------------------------|---------------------|----------|---------|------|------|------|-------|
| 26800 6<br>24000 5<br>21600 5<br>18900 5             | 159<br>191<br>155  | 20.3                        |                     |          | 226     |      |      |      |       |
| 24000 5<br>21600 5<br>18900 5                        | 91<br>55           | 20.3                        | 16.0                |          | 6.6.50  | 34.1 | 18.2 | 1340 | 0.85  |
| 21600 5<br>18900 5                                   | 55                 |                             |                     | 23.6     | 202     | 31.1 | 18.2 | 1220 | 0.80  |
| 18900 5  |                    |                             | 15.9                | 21.3     | 178     | 28.1 | 18.2 | 1090 | 0.83  |
|  | 4D                 | 19.5                        | 15.9                | 19.0     | 163     | 26.6 | 18.2 | 983  | 0.87  |
| 15100 5  | THE REAL PROPERTY. | 17.2                        | 15.9                | 17.2     | 158     | 26.6 | 18.2 | 858  | 0.88  |
|  | 42                 | 13.9                        | 12.8                | 16.7     | 153     | 26.6 | 18.1 | 708  | 0.87  |
| 24200 6  | 159                | 18.4                        | 14.2                | 20.9     | 202     | 31.1 | 18.2 | 1100 | 0.86  |
| 21800 5  | 91                 | 18.5                        | 14.1                | 18.9     | 178     | 28.1 | 18.2 | 992  | 0.87  |
| 18900 5  | 107                | 18.6                        | 14.1                | 16.4     | 149     | 24.4 | 18.2 | 858  | 0.81  |
| 16900 5  | 03                 | 16.8                        | 14.1                | 15.2     | 145     | 24.4 | 18.2 | 769  | 0.81  |
| 13900 4  | 197                | 14.0                        | 11.4                | 14.8     | 140     | 24.4 | 18.1 | 636  | 0.81  |
| 19200 6  | 59                 | 14.6                        | 10.6                | 15.7     | 202     | 31.1 | 18.2 | 874  | 0.80  |
| 17300 5  | 91                 | 14.6                        | 10.6                | 14.1     | 178     | 28.1 | 18.2 | 785  | 0.83  |
| 15000 5  | 07                 | 14.8                        | 10.6                | 12.3     | 149     | 24.4 | 18.2 | 682  | 0.81  |
| 13200 5  | 02                 | 13.2                        | 10.5                | 11.0     | 145     | 24.4 | 18.1 | 599  | 0.81  |
| 11300 4  |                    | 11.7                        | 8.6                 | 10.7     | 136     | 23.6 | 18.1 | 512  | 0.81  |
|  |                    |                             |                     |          |         |      |      |      |       |
|  |                    |                             |                     |          |         |      |      |      |       |
|  |                    |                             |                     |          | 7.4     |      |      |      |       |
|  |                    |                             |                     |          |         |      |      |      |       |
|  |                    |                             |                     |          |         |      |      |      |       |
|  |                    |                             |                     |          |         |      |      |      |       |
|  |                    |                             |                     |          |         |      |      |      |       |
|  |                    |                             |                     |          |         |      |      |      |       |
|  |                    |                             |                     |          |         |      |      |      |       |
|  |                    |                             |                     |          |         |      |      |      |       |

<sup>\*</sup> W, and D, values for this shape based upon allowable stress in accordance with AISC Specification Sec

Dash indicates that R is greater than V

Where I is the span in feet

Total allowable uniform load in kips = W\_7/L

End reaction in kips =  $W_c/2L$ 

Midspan deflection in inches =  $D_r \times L^2 / 1000$ .

For unbraced lengths greater than  $I_{\gamma}$ , and less than  $I_{\gamma}$ , multiply the constants  $W_i$  and  $D_i$  by the ratio 30/fwhere  $F_{\mu}=33$  km, except as follows. For W 40 × 18 × 192,  $F_{\mu}=31.9$  km, for W 40 × 16 × 174,  $F_{\mu}=32.8$  km,

Designation

> 327 294 264

> 359 328

318 286 256

Many / is the spen in Total allowable uni End reaction in kir

Mospen deflection ly worsed lengths 4 ma / = 33 ks

In. In.3

18.2 1340 18.2 1220 18.2 1090 18.2 983 18.2 858 18.1 708

18.2 1100 18.2 992 18.2 858 18.2 769 18.1 636

18.2 874 18.2 785 18.2 682 18.1 599 18.1 512

 $F_y = 50 \text{ ksi}$   $F_y = 50 \text{ ksi}$ 

#### **BEAMS**

### 40" Wide flange and tailor-made beams Uniform load constants for beams laterally supported

| 0.   |                     | W       | VII  | $L_v$ | L    | $L_u$ | R          | R;   | $N_{\rho}$ | S    | $D_c$   |
|------|---------------------|---------|------|-------|------|-------|------------|------|------------|------|---------|
| Ft 2 | Designation         |         |      |       | -    | ,,    |            | ,    | -          |      | -       |
| 4    |                     | Kip-ft. | Kip  | Ft.   | Ft.  | Ft.   | Kip        | Kip  | In.        | In.3 | In./Ft. |
|      | WTM 40 × 16 × 655   | 57000   | 1719 | 16.6  | 15.1 | 45.6  | 623        | 73.9 | 18.3       | 2590 | 0.78    |
| П    | 593                 | 51500   | 1539 | 16.7  | 14.9 | 41.8  | 545        | 67.1 | 18.3       | 2340 | 0.79    |
| П    | 531                 | 46000   | 1363 | 16.9  | 14.8 | 37.8  | 472        | 60.4 | 18.3       | 2090 | 0.81    |
| П    | 480                 | 41600   | 1221 | 17.0  | 14.7 | 34.4  | 411        | 54.7 | 18.3       | 1890 | 0.82    |
| Н    | 436                 | 37600   | 1108 | 17.0  | 14.5 | 31.4  | 367        | 50.3 | 18.2       | 1710 | 0.83    |
| Н    | 397                 | 34300   | 999  | 17.2  | 14.4 | 28.9  | 326        | 45.7 | 18.2       | 1560 | 0.83    |
| ,    | 362                 | 31200   | 908  | 17.2  | 14.3 | 26.5  | 289        | 42.0 | 18.3       | 1420 | 0.84    |
|      | 324                 | 28200   | 803  | 17.6  | 14.2 | 23.9  | 251        | 37.5 | 18.2       | 1280 | 0.85    |
|      | 297                 | 25700   | 741  | 17.3  | 14.2 | 21.8  | 229        | 34.9 | 18.2       | 1170 | 0.86    |
| 8    | 237                 | 23/00   | /41  | 17.0  | 14.2 | 21.0  | 225        | 04.5 | 10.2       | 1170 | 0.00    |
| 8    | WTM 40 × 12 × 561   | 45800   | 1719 | 13.3  | 11.6 | 35.0  | 623        | 73.9 | 18.3       | 2080 | 0.78    |
| 19   | 520                 | 42200   | 1579 | 13.4  | 11.5 | 32.7  | 562        | 68.6 | 18.3       | 1920 | 0.79    |
|      | 475                 | 38500   | 1440 | 13.4  | 11.3 | 30.0  | 503        | 63.4 | 18.3       | 1750 | 0.80    |
| 36   | 437                 | 35400   | 1314 | 13.5  | 11.2 | 27.7  | 450        | 58.5 | 18.3       | 1610 | 0.81    |
| 7 -  | 396                 | 32100   | 1183 | 13.6  | 11.1 | 25.4  | 399        | 53.2 | 18.2       | 1460 | 0.82    |
| 88   | 359                 | 29000   | 1071 | 13.5  | 11.0 | 23.0  | 350        | 48.8 | 18.3       | 1320 | 0.83    |
| 38   | 327                 | 26400   | 963  | 13.7  | 10.9 | 21.1  | 310        | 44.2 | 18.3       | 1200 | 0.84    |
| 39   | 294                 | 23800   | 856  | 13.9  | 10.8 | 19.2  | 271        | 39.8 | 18.2       | 1080 | 0.85    |
| U    | 264                 | 21400   | 768  | 13.9  | 10.7 | 17.2  | 239        | 36.0 | 18.2       | 971  | 0.85    |
| ı    | WTM 36 × 16.5 × 848 | 69700   | 2139 | 16.3  | 16.2 | 64.5  | 868        | 94.5 | 17.0       | 3170 | 0.80    |
|      | 798                 | 65600   | 1998 | 16.4  | 16.1 | 61.3  | 798        | 89.2 | 16.9       | 2980 | 0.81    |
| н    | 720                 | 59200   | 1784 | 16.6  | 15.9 | 56.1  | 695        | 81.2 | 16.9       | 2690 | 0.83    |
|      | 650                 | 53200   | 1595 | 16.7  | 15.7 | 51.2  | 605        | 73.9 | 16.9       | 2420 | 0.84    |
| П    | 588                 | 48000   | 1426 | 16.8  | 15.6 | 47.0  | 529        | 67.1 | 16.9       | 2180 | 0.86    |
|      | 527                 | 42900   | 1263 | 17.0  | 15.4 | 42.6  | 457        | 60.4 | 16.8       | 1950 | 0.87    |
| н    | 485                 | 39400   | 1162 | 17.0  | 15.3 | 39.4  | 411        | 56.3 | 16.8       | 1790 | 0.88    |
| п    | 439                 | 35600   | 1041 | 17.1  | 15.2 | 36.1  | 360        | 51.0 | 16.8       | 1620 | 0.89    |
| В    | 393                 | 31900   | 922  | 17.3  | 15.1 | 32.7  | 312        | 45.7 | 16.8       | 1450 | 0.90    |
| в    | 359                 | 29000   | 838  | 17.3  | 15.0 | 30.0  | 278        | 42.0 | 16.8       | 1320 | 0.91    |
| 1    | 328                 | 26600   | 757  | 17.6  | 14.9 | 27.6  | 249        | 38.3 | 16.8       | 1210 | 0.92    |
| -    | WTM 36 × 12 × 548   | 42500   | 1618 | 13.1  | 11.8 | 38.0  | 586        | 73.9 | 17.5       | 1930 | 0.83    |
|      | 508                 | 39400   | 1485 | 13.1  | 11.7 | 35.6  | 532        | 68.6 | 17.4       | 1790 | 0.84    |
|      | 464                 | 35900   | 1353 | 13.3  | 11.6 | 32.6  | 475        | 63.4 | 17.3       | 1630 | 0.85    |
|      | 464 426             | 35900   | 1234 | 13.3  | 11.5 | 30.2  | 420        | 58.5 | 17.4       | 1490 | 0.86    |
| 1    | 387                 | 29700   |      | 13.4  | 11.3 | 27.7  | 373        | 53.2 | 17.3       | 1350 | 0.87    |
| I    | 350                 | 26800   | 1110 | 13.4  | 11.2 | 25.1  | 329        | 48.8 | 17.3       | 1220 | 0.88    |
|      |                     |         |      | 13.5  | 11.1 | 23.1  | 290        | 44.2 | 17.3       | 1110 | 0.89    |
|      | 318                 | 24400   | 902  |       |      | 20.9  | 253        | 39.8 | 17.3       | 1000 | 0.90    |
| I    | 286                 | 22000   | 802  | 13.7  | 11.0 |       |            | 36.0 | 17.3       | 895  | 0.91    |
|      | 256                 | 19700   | 719  | 13.7  | 10.9 | 18.8  | 221<br>196 | 36.0 | 17.3       | 809  | 0.92    |
| ct.  | 232                 | 17800   | 646  | 13.8  | 10.9 | 17.1  | 190        | 32.0 | 17.3       | 009  | 0.92    |
| 180  |                     |         |      |       |      |       |            |      |            |      |         |

Notes

Where L is the span in feet:

Total allowable uniform load in kips =  $W_c/L$ .

End reaction in kips =  $W_c/2L$ .

Midspan deflection in inches =  $D_c \times L^2 / 1000$ .

For unbraced lengths greater than  $L_c$  and less than  $L_u$ , multiply the constants  $W_c$  and  $D_c$  by the ratio 30/ $F_b$ . where  $F_b = 33 \text{ ksi}$ 

 $W_c$  and  $D_c$  by the ratio  $30/F_b$   $\times$   $16 \times 174$ ,  $F_b = 32.8$  ksi.

with AISC Specification

#### BEAMS

### 40" Wide flange and tailor-made beams Uniform load constants for beams laterally supported

|                      | Wc             | V    | $L_v$ | $L_c$ | $L_{u}$ | R   | $R_i$ | $N_e$ | S    | D        |
|----------------------|----------------|------|-------|-------|---------|-----|-------|-------|------|----------|
| Designation          | Kip-ft.        | Kip  | Ft.   | Ft.   | Ft.     | Kip | Kip   | In.   | In.3 | In./F    |
| WTM 33 × 15.75 × 619 | 47700          | 1516 | 15.7  | 15.1  | 51.9    | 582 | 73.9  | 16.1  | 2170 | 0.89     |
| 567                  | 43800          | 1372 | 16.0  | 15.0  | 48.2    | 513 | 67.9  | 16.2  | 1990 | 0.9      |
| 515                  | 39800          | 1233 | 16.1  | 14.9  | 44.3    | 452 | 61.9  | 16.1  | 1810 | 0.9      |
| 468                  | 35900          | 1119 | 16.0  | 14.7  | 40.5    | 399 | 57.0  | 16.1  | 1630 | 0.9      |
| 424                  | 32600          | 1003 | 16.3  | 14.6  | 37.1    | 353 | 51.7  | 16.1  | 1480 | 0.9      |
| 387                  | 29700          | 906  | 16.4  | 14.5  | 34.2    | 313 | 47.3  | 16.0  | 1350 | 0.9      |
| 354                  | 27100          | 825  | 16.4  | 14.4  | 31.6    | 277 | 43.5  | 16.1  | 1230 | 0.9      |
| 318                  | 24400          | 731  | 16.7  | 14.3  | 28.6    | 241 | 39.0  | 16.1  | 1110 | 0.9      |
| 291                  | 22200          | 669  | 16.6  | 14.2  | 26.3    | 218 | 36.0  | 16.0  | 1010 | 0.9      |
| 263                  | 20200          | 601  | 16.8  | 14.2  | 24.0    | 192 | 32.6  | 16.0  | 917  | 0.99     |
| WTM 33 × 11.5 × 520  | 37600          | 1516 | 12.4  | 11.5  | 39.3    | 582 | 73.9  | 16.1  | 1710 | 0.8      |
| 476                  | 34300          | 1373 | 12.5  | 11.3  | 36.3    | 513 | 67.9  | 16.2  | 1560 | 0.9      |
| 432                  | 31200          | 1233 | 12.6  | 11.2  | 33.3    | 452 | 61.9  | 16.1  | 1420 | 0.9      |
| 398                  | 28600          | 1136 | 12.6  | 11.1  | 30.8    | 408 | 57.8  | 16.1  | 1300 | 0.9      |
| 361                  | 26000          | 1020 | 12.7  | 11.0  | 28.2    | 358 | 52.5  | 16.1  | 1180 | 0.9      |
| 332                  | 23800          | 937  | 12.7  | 10.9  | 26.0    | 323 | 48.8  | 16.1  | 1080 | 0.9      |
| 302                  | 21600          | 841  | 12.8  | 10.8  | 23.9    | 288 | 44.2  | 16.0  | 983  | 0.9      |
| 271                  | 19500          | 747  | 13.1  | 10.7  | 21.7    | 248 | 39.8  | 16.0  | 884  | 0.9      |
| 243                  | 17400          | 669  | 13.0  | 10.6  | 19.5    | 218 | 36.0  | 16.0  | 791  | 0.9      |
| 219                  | 15700          | 601  | 13.1  | 10.5  | 17.7    | 192 | 32.6  | 16.0  | 714  | 0.99     |
| 204                  | 14600          | 556  | 13.1  | 10.4  | 16.5    | 175 | 30.4  | 16.0  | 662  | 1.0      |
| 187                  | 13400          | 511  | 13.1  | 10.4  | 15.2    | 158 | 28.1  | 16.0  | 607  | 1.0      |
| 169                  | 12100          | 453  | 13.3  | 10.3  | 13.8    | 140 | 25.1  | 16.0  | 549  | 1.0      |
| WTM 32 × 12 × 511    | 34800          | 1418 | 12.3  | 11.6  | 42.6    | 619 | 73.9  | 14.3  | 1580 | 0.9      |
| 462                  | 31500          | 1266 | 12.4  | 11.5  | 39.0    | 541 | 67.1  | 14.3  | 1430 | 0.9      |
| 418                  | 28400          | 1134 | 12.5  | 11.3  | 35.8    | 474 | 61.1  | 14.3  | 1290 | 0.9      |
| 380                  | 25700          | 1027 | 12.5  | 11.2  | 32.7    | 422 | 56.3  | 14.3  | 1170 | 1.0      |
| 343                  | 23300          | 919  | 12.7  | 11.1  | 29.8    | 370 | 51.0  | 14.3  | 1060 | 1.0      |
| 313                  | 21200          | 828  | 12.8  | 11.0  | 27.4    | 328 | 46.5  | 14.2  | 963  | 1.0      |
| 286                  | 19300          | 752  | 12.8  | 10.9  | 25.2    | 294 | 42.7  |       |      | 1.0      |
| 256                  | 17300          | 665  | 13.0  | 10.8  | 22.8    | 256 | 38.3  |       |      | 1.0      |
| 234                  | 15800          | 607  | 13.0  | 10.7  | 20.9    | 229 | 35.3  | 14.2  | 719  | 1.1      |
| 256                  | 19300<br>17300 | 665  | 13.0  | 10.8  |         |     |       |       |      | 14.2 788 |

Notes:

Where L is the span in feet:

Total allowable uniform load in kips =  $W_{\rm c}/L$ .

End reaction in kips =  $W_c/2L$ 

Midspan deflection in inches =  $D_c \times L^2 / 1000$ .

For unbraced lengths greater than L and less than  $L_u$ , multiply the constants  $W_c$  and  $D_c$  by the ration 30/Fwhere  $F_h = 33$  ksi.

 $f_i = 50 \text{ ksi}$  $F_y = 50 \text{ ks}$ 

Designation

165 148

Mere L is the span in Total allowable un

End reaction in kin Midspan deflection

for unbraced lengths were  $F_b = 33$  ksi.

 $F_y = 50 \text{ ksi}$   $F_y = 50 \text{ ksi}$ 

#### **BEAMS**

### 40" Wide flange and tailor-made beams Uniform load constants for beams laterally supported

|       |      |          |                     |            | 101    | Dodino | latora | ny oup  | oortea |       |       |             |          |
|-------|------|----------|---------------------|------------|--------|--------|--------|---------|--------|-------|-------|-------------|----------|
| $N_e$ | S    | De       | Designation         | $W_c$      | V      | $L_v$  | $L_c$  | $L_{u}$ | R      | $R_i$ | $N_e$ | S           | $D_c$    |
| In.   | In.3 | In./Ft.a | Designation         | Kip-ft.    | Kip    | Ft.    | Ft.    | Ft.     | Kip    | Kip   | In.   | In.3        | In./Ft.2 |
| 16.1  | 2170 |          | WTM 30 × 15 × 581   | 41100      | 1394   | 14.7   | 14.5   | 54.0    | 577    | 73.9  | 14.6  | 1870        | 0.96     |
| 16.2  |      | 0.89     | 526                 | 37000      | 1244   | 14.9   | 14.3   | 49.6    | 503    | 67.1  | 14.5  | 1680        | 0.98     |
| 16.1  | 1990 | 0.90     | 477                 | 33700      | 1115   | 15.1   | 14.2   | 45.6    | 443    | 61.1  | 14.5  | 1530        | 1.0      |
| 16.1  | 1810 | 0.91     | 433                 | 30400      | 1010   | 15.1   | 14.1   | 41.7    | 390    | 56.3  | 14.5  | 1380        |          |
| 16.1  | 1630 | 0.93     | 391                 | 27500      | 903    | 15.2   | 14.0   | 38.2    | 344    | 51.0  | 14.5  | 1250        | 1.0      |
| 16.0  | 1480 | 0.94     | 357                 | 25100      | 813    | 15.4   | 13.9   | 35.2    | 302    | 46.5  | 14.5  | 1140        | 1.0      |
|       | 1350 | 0.95     | 326                 | 22700      | 739    | 15.4   | 13.8   | 32.4    | 270    | 40.5  |       |             |          |
| 16.1  | 1230 | 0.96     | 292                 | 20400      | 653    | 15.4   | 13.7   | 29.4    | 234    | 38.3  | 14.5  | 1030<br>928 | 1.1      |
| 16.1  | 1110 | 0.97     | 261                 | 18200      | 588    | 15.5   | 13.6   | 26.4    | 207    | 34.9  |       |             | 1.1      |
| 16.0  | 1010 | 0.98     | 235                 | 16400      | 520    | 15.8   | 13.5   |         | 179    |       | 14.4  | 827         | 1.1      |
| 16.0  | 917  | 0.99     | 235                 | 16400      | 520    | 15.8   | 13.5   | 24.0    | 1/9    | 31.1  | 14.4  | 746         | 1.1      |
| 16.1  | 1710 | 0.89     | WTM 30 × 10.5 × 475 | 31200      | 1395   | 11.2   | 10.6   | 39.3    | 577    | 73.9  | 14.6  | 1420        | 0.96     |
| 16.2  | 1560 | 0.90     | 435                 | 28400      | 1262   | 11.3   | 10.4   | 36.4    | 513    | 67.9  | 14.5  | 1290        | 0.98     |
| 16.1  | 1420 | 0.91     | 394                 | 25700      | 1132   | 11.4   | 10.3   | 33.4    | 449    | 61.9  | 14.5  | 1170        | 1.0      |
| 16.1  | 1300 | 0.93     | 358                 | 23300      | 1026   | 11.4   | 10.2   | 30.5    | 399    | 57.0  | 14.5  | 1060        | 1.0      |
| 16.1  | 1180 | 0.94     | 323                 | 21000      | 918    | 11.4   | 10.0   | 27.8    | 349    | 51.7  | 14.5  | 955         | 1.0      |
| 16.1  | 1080 | 0.95     | 295                 | 19200      | 829    | 11.6   | 9.9    | 25.6    | 310    | 47.3  | 14.5  | 871         | 1.0      |
| 16.0  | 983  | 0.96     | 269                 | 17500      | 754    | 11.6   | 9.8    | 23.6    | 277    | 43.5  | 14.4  | 793         | 1.1      |
| 16.0  | 884  | 0.97     | 246                 | 16000      | 682    | 11.7   | 9.8    | 21.8    | 246    | 39.8  | 14.5  | 727         | 1.1      |
| 16.0  | 791  | 0.98     | 226                 | 14600      | 624    | 11.7   | 9.7    | 20.0    | 223    | 36.7  | 14.4  | 665         | 1.1      |
| 16.0  | 714  | 0.99     | 207                 | 13300      | 574    | 11.6   | 9.6    | 18.3    | 200    | 34.1  | 14.4  | 605         | 1.1      |
| 16.0  | 662  | 1.0      | 185                 | 12000      | 506    | 11.9   | 9.5    | 16.6    | 175    | 30.4  | 14.4  | 543         | 1.1      |
| 16.0  | 607  | 1.0      | 165                 | 10600      | 451    | 11.7   | 9.5    | 14.8    | 152    | 27.4  | 14.4  | 483         | 1.1      |
| 16.0  | 549  | 1.0      | 148                 | 9580       | 399    | 12.0   | 9.4    | 13.4    | 134    | 24.4  | 14.4  | 436         | 1.1      |
|       |      | 0.95     | WTM 28 × 12 × 485   | 29700      | 1266   | 11.7   | 11.7   | 47.8    | 605    | 73.9  | 12.4  | 1350        | 1.1      |
| 14.3  | 1580 |          | 438                 | 26600      | 1128   | 11.8   | 11.5   | 43.9    | 529    | 67.1  | 12.4  | 1210        | 1.1      |
| 14.3  | 1430 | 0.97     | 397                 | 24200      | 1009   | 12.0   | 11.4   | 40.3    | 466    | 61.1  | 12.4  | 1100        | 1.1      |
| 14.3  | 1290 | 0.98     | 360                 | 21800      | 912    | 12.0   | 11.2   | 36.9    | 411    | 56.3  | 12.4  | 990         | 1.1      |
| 14.3  | 1170 | 1.0      | 325                 | 19700      | 814    | 12.1   | 11.1   | 33.7    | 360    | 51.0  | 12.4  | 894         | 1.1      |
| 14.3  | 1060 | 1.0      | 296                 | 17900      | 732    | 12.2   | 11.0   | 31.0    | 320    | 46.5  | 12.4  | 815         | 1.2      |
| 14.2  | 963  | 1.0      | 270                 | 16300      | 664    | 12.3   | 10.9   | 28.6    | 286    | 42.7  | 12.3  | 742         | 1.2      |
| 14.2  | 878  | 1.0      | 247                 | 15000      | 599    | 12.5   | 10.8   | 26.4    | 256    | 39.0  | 12.3  | 680         | 1.2      |
| 14.2  | 788  | 1.0      | 226                 | 13700      | 547    | 12.5   | 10.8   | 24.3    | 230    | 36.0  | 12.3  | 621         | 1.2      |
| 14.2  | 719  | 1.1      |                     | n dinos    |        |        |        |         |        |       |       |             |          |
|       |      |          | 1 20 942            | 17 14000.3 | i i-nd |        |        |         |        |       |       |             |          |
|       |      |          |                     |            |        |        |        |         |        |       |       |             |          |
|       |      |          |                     |            |        |        |        |         |        |       |       |             |          |
|       |      |          |                     |            |        |        |        |         |        |       |       |             | -        |

Where L is the span in feet:

Total allowable uniform load in kips =  $W_c/L$ .

End reaction in kips =  $W_c/2L$ .

Midspan deflection in inches =  $D_c \times L^2 / 1000$ .

For unbraced lengths greater than  $L_c$  and less than  $L_u$ , multiply the constants  $W_c$  and  $D_c$  by the ratio 30/ $F_b$ . where  $F_b = 33 \text{ ksi.}$ 

, and  $D_{\rm c}$  by the ration  $30/F_{\rm b}$ 

Designation

I

# 40" Wide flange and tailor-made beams Uniform load constants for beams laterally supported

| Designation       | Wc      | V    | $L_v$ | $L_c$ | $L_{u}$ | R   | $R_i$ | Ne   | S    |     |
|-------------------|---------|------|-------|-------|---------|-----|-------|------|------|-----|
| Designation       | Kip-ft. | Kip  | Ft.   | Ft.   | Ft.     | Kip | Kip   | In.  | In.3 | In. |
| VTM 27 × 14 × 539 | 34500   | 1281 | 13.5  | 13.7  | 55.4    | 573 | 73.9  | 13.1 | 1570 | 1   |
| 494               | 31700   | 1157 | 13.7  | 13.5  | 51.5    | 509 | 67.9  | 13.1 | 1440 | 1   |
| 448               | 28600   | 1037 | 13.8  | 13.4  | 47.4    | 445 | 61.9  | 13.1 | 1300 | 1   |
| 407               | 25700   | 938  | 13.7  | 13.3  | 43.5    | 395 | 57.0  | 13.0 | 1170 | 1   |
| 368               | 23300   | 839  | 13.9  | 13.1  | 39.9    | 346 | 51.7  | 13.0 | 1060 | 1   |
| 336               | 21300   | 756  | 14.1  | 13.0  | 36.8    | 307 | 47.3  | 13.0 | 970  | 1   |
| 307               | 19500   | 687  | 14.2  | 12.9  | 34.0    | 275 | 43.5  | 13.0 | 884  | 1   |
| 281               | 17900   | 621  | 14.4  | 12.9  | 31.5    | 243 | 39.8  | 13.0 | 811  | 1   |
| 258               | 16300   | 568  | 14.3  | 12.8  | 29.1    | 220 | 36.7  | 13.0 | 742  | 1   |
| 235               | 14800   | 522  | 14.2  | 12.7  | 26.6    | 198 | 34.1  | 13.0 | 674  | 1   |
| 217               | 13700   | 472  | 14.5  | 12.6  | 24.8    | 177 | 31.1  | 13.0 | 624  | 1   |
| 194               | 12200   | 422  | 14.5  | 12.6  | 22.3    | 156 | 28.1  | 12.9 | 556  | 1   |
| VTM 27 × 10 × 446 | 26600   | 1281 | 10.4  | 10.2  | 41.3    | 573 | 73.9  | 13.1 | 1210 | 1   |
| 407               | 24400   | 1157 | 10.5  | 10.0  | 38.2    | 509 | 67.9  | 13.1 | 1110 | 1   |
| 369               | 22000   | 1037 | 10.6  | 9.9   | 35.1    | 445 | 61.9  | 13.1 | 1000 | 1   |
| 335               | 19800   | 938  | 10.6  | 9.8   | 32.1    | 395 | 57.0  | 13.0 | 902  | 1   |
| 302               | 17900   | 839  | 10.7  | 9.7   | 29.3    | 346 | 51.7  | 13.0 | 815  | 1   |
| 271               | 16000   | 742  | 10.8  | 9.5   | 26.6    | 302 | 46.5  | 13.0 | 729  | 1   |
| 247               | 14600   | 673  | 10.8  | 9.4   | 24.4    | 267 | 42.7  | 13.0 | 662  | 1   |
| 221               | 13000   | 594  | 10.9  | 9.3   | 22.1    | 232 | 38.3  | 13.0 | 593  | 1   |
| 201               | 11900   | 542  | 11.0  | 9.3   | 20.2    | 209 | 35.3  | 12.9 | 540  | 1   |
| 182               | 10700   | 484  | 11.0  | 9.2   | 18.5    | 183 | 31.9  | 12.9 | 488  | 1   |
| 159               | 9320    | 422  | 11.1  | 9.1   | 16.1    | 156 | 28.1  | 12.9 | 424  | 1   |
| 143               | 8420    | 373  | 11.3  | 9.0   | 14.7    | 137 | 25.1  | 12.9 | 383  | 1   |
| 129               | 7580    | 337  | 11.2  | 9.0   | 13.3    | 122 | 22.9  | 12.9 | 345  | 1   |
| VTM 26 × 12 × 473 | 27300   | 1191 | 11.5  | 11.7  | 50.9    | 605 | 73.9  | 11.4 | 1240 | 1   |
| 427               | 24600   | 1060 | 11.6  | 11.5  | 46.8    | 529 | 67.1  | 11.4 | 1120 | 1   |
| 387               | 22200   | 947  | 11.7  | 11.4  | 43.0    | 462 | 61.1  | 11.4 | 1010 | 1   |
| 351               | 20000   | 855  | 11.7  | 11.3  | 39.4    | 411 | 56.3  | 11.4 | 909  | 1   |
| 317               | 18100   | 762  | 11.9  | 11.1  | 36.1    | 360 | 51.0  | 11.4 | 821  | 1   |
| 289               | 16500   | 685  | 12.0  | 11.0  | 33.3    | 320 | 46.5  | 11.4 | 748  | 1   |
| 264               | 15000   | 621  | 12.1  | 10.9  | 30.7    | 286 | 42.7  | 11.3 | 680  | 1   |
| 241               | 13700   | 560  | 12.2  | 10.9  | 28.4    | 254 | 39.0  | 11.4 | 624  | 1   |
| 221               | 12500   | 511  | 12.2  | 10.8  | 26.1    | 230 | 36.0  | 11.3 | 569  | 1   |
| 221               | 12500   |      |       |       |         |     |       |      |      |     |

Notes:

Where L is the span in feet:

Total allowable uniform load in kips =  $W_{\rm c}/L$ 

End reaction in kips =  $W_c/2L$ 

Midspan deflection in inches =  $D_c \times L^2 / 1000$ .

For unbraced lengths greater than  $L_c$  and less than  $L_u$ , multiply the constants  $W_c$  and  $D_c$  by the ration 30/, where  $F_b=33$  ksi.

fotal allowable unification in kips and deflection in with a section in which a section in with a section in with a section in which a section in with a section in which it is a section in with a section in wit

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In. In.3

909 11.4 821 11.4 748 11.4 680 624 11.4 569

 $F_y = 50 \text{ ks}$   $F_y = 50 \text{ ksi}$ 

#### BEAMS

## 40" Wide flange and tailor-made beams Uniform load constants for beams laterally supported

| 1  |                      |         | 101  | Douine | latora | ny oup | ported |       |       |      |          |
|----|----------------------|---------|------|--------|--------|--------|--------|-------|-------|------|----------|
| D. | Designation          | $W_c$   | V    | $L_v$  | $L_c$  | $L_u$  | R      | $R_i$ | $N_e$ | S    | $D_c$    |
| P  | Designation          | Kip-ft. | Kip  | Ft.    | Ft.    | Ft.    | Kip    | Kip   | ln.   | In.3 | In./Ft.2 |
| .0 | WTM 24 × 12.75 × 492 | 28400   | 1168 | 12.2   | 12.6   | 56.2   | 577    | 73.9  | 11.5  | 1290 | 1.2      |
| 1  | 450                  | 25700   | 1053 | 12.2   | 12.5   | 52.3   | 513    | 67.9  | 11.5  | 1170 | 1.2      |
| 1  | 408                  | 23300   | 942  | 12.4   | 12.4   | 48.2   | 449    | 61.9  | 11.5  | 1060 | 1.2      |
|    | 370                  | 21000   | 851  | 12.3   | 12.2   | 44.2   | 399    | 57.0  | 11.4  | 957  | 1.2      |
| 1  | 335                  | 19000   | 760  | 12.5   | 12.1   | 40.6   | 349    | 51.7  | 11.4  | 864  | 1.2      |
|    | 306                  | 17400   | 684  | 12.7   | 12.0   | 37.6   | 310    | 47.3  | 11.4  | 789  | 1.3      |
| 2  | 279                  | 15800   | 620  | 12.7   | 11.9   | 34.7   | 277    | 43.5  | 11.4  | 718  | 1.3      |
| 2  | 250                  | 14200   | 548  | 13.0   | 11.8   | 31.5   | 241    | 39.0  | 11.4  | 644  | 1.3      |
| 2  | 229                  | 12900   | 500  | 12.9   | 11.7   | 29.1   | 216    | 36.0  | 11.4  | 588  | 1.3      |
| 2  | 207                  | 11700   | 447  | 13.1   | 11.7   | 26.5   | 192    | 32.6  | 11.3  | 531  | 1.3      |
| 3  | 192                  | 10800   | 413  | 13.1   | 11.6   | 24.7   | 175    | 30.4  | 11.3  | 491  | 1.3      |
| 2  | 176                  | 9910    | 379  | 13.1   | 11.5   | 22.8   | 158    | 28.1  | 11.3  | 450  | 1.4      |
| 1  | 170                  | 9910    | 3/3  | 13.1   | 11.5   | 22.0   | 150    | 20.1  | 11.3  | 450  | 1.4      |
| .0 | WTM 24 × 12 × 457    | 24600   | 1104 | 11.1   | 11.7   | 54.1   | 603    | 73.1  | 10.3  | 1120 | 1.2      |
| 1  | 414                  | 22200   | 991  | 11.2   | 11.5   | 49.8   | 533    | 67.1  | 10.3  | 1010 | 1.2      |
|    | 375                  | 20100   | 884  | 11.4   | 11.4   | 45.8   | 470    | 61.1  | 10.3  | 913  | 1.3      |
| .1 | 343                  | 18300   | 799  | 11.4   | 11.3   | 42.5   | 422    | 56.3  | 10.2  | 833  | 1.3      |
|    | 310                  | 16600   | 712  | 11.7   | 11.2   | 39.0   | 367    | 51.0  | 10.3  | 752  | 1.3      |
| 1  | 280                  | 14900   | 638  | 11.7   | 11.1   | 35.5   | 325    | 46.5  | 10.2  | 675  | 1.3      |
| 2  | 253                  | 13500   | 567  | 11.9   | 10.9   | 32.7   | 286    | 42.0  | 10.2  | 612  | 1.3      |
| 2  | 228                  | 12100   | 508  | 11.9   | 10.9   | 29.7   | 251    | 38.3  | 10.2  | 550  | 1.4      |
| 2  | 207                  | 11000   | 458  | 12.0   | 10.8   | 27.2   | 225    | 34.9  | 10.2  | 499  | 1.4      |
| 2  | 188                  | 9960    | 413  | 12.1   | 10.7   | 24.9   | 199    | 31.9  | 10.2  | 453  | 1.4      |
| 2  |                      | 0000    | 110  | 12.1   | 10.1   | 21.0   | 100    | 01.0  | 10.2  | 100  | 1.1      |
| 2  | WTM 24 × 9 × 354     | 18900   | 1010 | 9.4    | 9.1    | 37.1   | 488    | 65.6  | 11.5  | 857  | 1.2      |
| 2  | 319                  | 17000   | 900  | 9.4    | 9.0    | 33.9   | 425    | 59.6  | 11.5  | 771  | 1.2      |
| в  | 291                  | 15400   | 813  | 9.5    | 8.9    | 31.3   | 380    | 54.7  | 11.4  | 701  | 1.2      |
| 1  | 264                  | 13900   | 733  | 9.5    | 8.8    | 28.6   | 336    | 50.3  | 11.4  | 633  | 1.2      |
| 2  | 239                  | 12600   | 658  | 9.6    | 8.7    | 26.3   | 297    | 45.7  | 11.4  | 574  | 1.3      |
| 2  | 218                  | 11500   | 595  | 9.7    | 8.6    | 24.1   | 265    | 42.0  | 11.4  | 521  | 1.3      |
| 1  | 198                  | 10400   | 536  | 9.7    | 8.5    | 22.2   | 234    | 38.3  | 11.4  | 475  | 1.3      |
| 2  | 181                  | 9500    | 488  | 9.7    | 8.4    | 20.4   | 212    | 35.3  | 11.3  | 432  | 1.3      |
| 3  | 163                  | 8580    | 436  | 9.8    | 8.3    | 18.6   | 185    | 31.9  | 11.4  | 390  | 1.3      |
| 1  | 146                  | 7670    | 390  | 9.8    | 8.3    | 16.7   | 164    | 28.9  | 11.3  | 348  | 1.3      |
| 1  | 128                  | 6710    | 335  | 10.0   | 8.2    | 14.8   | 138    | 25.1  | 11.3  | 305  | 1.4      |
|    | 115                  | 6040    | 302  | 10.0   | 8.1    | 13.4   | 123    | 22.9  | 11.3  | 275  | 1.4      |
| 1  | 103                  | 5380    | 270  | 10.0   | 8.1    | 12.0   | 108    | 20.6  | 11.3  | 245  | 1.4      |
| r  | 103                  | 5360    | 2/0  | 10.0   | 0.1    | 12.0   | 100    | 20.6  | 11.5  | 240  | 1.4      |
| ı  |                      |         |      |        |        |        |        |       |       |      |          |
|    |                      |         |      |        |        |        |        |       |       |      |          |
|    |                      |         |      |        |        |        |        |       |       |      |          |

Notes

Where L is the span in feet:

Total allowable uniform load in kips =  $W_c/L$ .

End reaction in kips =  $W_c/2L$ .

Midspan deflection in inches =  $D_c \times L^2 / 1000$ .

For unbraced lengths greater than  $L_c$  and less than  $L_u$ , multiply the constants  $W_c$  and  $D_c$  by the ratio  $30/F_b$ , where  $F_b = 33 \text{ ksi.}$ 

 $V_c$  and  $D_c$  by the ration 30/F

I

## 40" Wide flange and tailor-made beams Uniform load constants for beams laterally supported

|                      | Wc      | V   | $L_v$ | $L_c$ | $L_u$ | R   | $R_i$ | $N_e$ | S    |     |
|----------------------|---------|-----|-------|-------|-------|-----|-------|-------|------|-----|
| Designation          | Kip-ft. | Kip | Ft.   | Ft.   | Ft.   | Kip | Kip   | In.   | In.3 | In. |
| WTM 22 × 12 × 395    | 19700   | 898 | 11.0  | 11.5  | 52.6  | 513 | 65.6  | 9.4   | 895  | 1   |
| 357                  | 17800   | 799 | 11.1  | 11.4  | 48.4  | 451 | 59.6  | 9.3   | 807  | 1   |
| 326                  | 16200   | 720 | 11.3  | 11.3  | 44.9  | 400 | 54.7  | 9.3   | 734  | 1   |
| 295                  | 14600   | 648 | 11.3  | 11.2  | 41.2  | 355 | 50.3  | 9.3   | 663  |     |
| 269                  | 13300   | 580 | 11.5  | 11.1  | 38.1  | 315 | 45.7  | 9.3   | 603  |     |
| 245                  | 12100   | 524 | 11.5  | 11.0  | 35.1  | 281 | 42.0  | 9.3   | 548  |     |
| 223                  | 11000   | 471 | 11.7  | 10.9  | 32.5  | 251 | 38.3  | 9.2   | 501  |     |
| 204                  | 10000   | 428 | 11.7  | 10.8  | 29.9  | 225 | 35.3  | 9.3   | 456  |     |
| WTM 22 × 8.5 × 236   | 11300   | 649 | 8.7   | 8.1   | 28.2  | 338 | 48.8  | 9.9   | 514  | 1   |
| 216                  | 10300   | 590 | 8.7   | 8.0   | 26.0  | 304 | 45.0  | 9.9   | 468  |     |
| 194                  | 9260    | 523 | 8.9   | 7.9   | 23.7  | 266 | 40.5  | 9.8   | 421  | 1   |
| 178                  | 8470    | 478 | 8.9   | 7.8   | 21.8  | 239 | 37.5  | 9.9   | 385  |     |
| 161                  | 7660    | 429 | 8.9   | 7.7   | 19.9  | 213 | 34.1  | 9.8   | 348  |     |
| 146                  | 6920    | 386 | 9.0   | 7.7   | 18.2  | 189 | 31.1  | 9.8   | 315  |     |
| 133                  | 6320    | 345 | 9.2   | 7.6   | 16.7  | 167 | 28.1  | 9.8   | 287  |     |
| 118                  | 5570    | 304 | 9.2   | 7.5   | 14.8  | 146 | 25.1  | 9.8   | 253  | 1   |
| WTM 21 × 12.25 × 402 | 20600   | 900 | 11.4  | 12.0  | 53.8  | 478 | 64.9  | 10.0  | 937  |     |
| 364                  | 18600   | 810 | 11.5  | 11.9  | 49.5  | 425 | 59.6  | 10.0  | 846  | 1   |
| 333                  | 16900   | 730 | 11.6  | 11.8  | 45.9  | 376 | 54.7  | 10.0  | 769  | 1   |
| 300                  | 15200   | 648 | 11.7  | 11.6  | 42.0  | 328 | 49.5  | 10.0  | 692  | 1   |
| 275                  | 13900   | 589 | 11.8  | 11.5  | 39.0  | 297 | 45.7  | 9.9   | 632  | 1   |
| 248                  | 12500   | 522 | 12.0  | 11.4  | 35.7  | 258 | 41.3  | 9.9   | 569  | 1   |
| 223                  | 11200   | 467 | 12.0  | 11.4  | 32.4  | 227 | 37.5  | 9.9   | 510  | 1   |
| 201                  | 10100   | 419 | 12.0  | 11.3  | 29.7  | 200 | 34.1  | 9.9   | 461  | 1   |
| 182                  | 9170    | 377 | 12.2  | 11.2  | 27.1  | 179 | 31.1  | 9.9   | 417  | 1   |
| 166                  | 8370    | 337 | 12.4  | 11.1  | 25.0  | 158 | 28.1  | 9.9   | 380  | 1   |
| WTM 18 × 11 × 311    | 13700   | 679 | 10.1  | 10.8  | 49.1  | 395 | 57.0  | 8.5   | 624  | 1   |
| 283                  | 12400   | 612 | 10.1  | 10.6  | 45.3  | 351 | 52.5  | 8.5   | 564  | 1   |
| 258                  | 11300   | 549 | 10.3  | 10.5  | 42.0  | 312 | 48.0  | 8.4   | 514  | 1   |
| 234                  | 10200   | 489 | 10.4  | 10.4  | 38.9  | 272 | 43.5  | 8.5   | 466  | 1   |
| 211                  | 9210    | 438 | 10.5  | 10.3  | 35.6  | 241 | 39.8  | 8.5   | 419  | 1   |
| 192                  | 8370    | 391 | 10.7  | 10.3  | 32.8  | 214 | 36.0  | 8.4   | 380  | 1   |
| 175                  | 7580    | 357 | 10.6  | 10.2  | 30.1  | 192 | 33.4  | 8.4   | 344  | 1   |
| 158                  | 6820    | 319 | 10.7  | 10.1  | 27.5  | 171 | 30.4  | 8.4   | 310  | 1   |
| 143                  | 6210    | 285 | 10.9  | 10.0  | 25.3  | 151 | 27.4  | 8.4   | 282  | 1   |
| 130                  | 5630    | 258 | 10.9  | 10.0  | 23.2  | 135 | 25.1  | 8.4   | 256  | 1   |

Notes:

Where L is the span in feet:

Total allowable uniform load in kips =  $W_{\rm c}/L$ .

End reaction in kips =  $W_c/2L$ .

Midspan deflection in inches =  $D_c \times L^2 / 1000$ .

For unbraced lengths greater than  $L_{\rm c}$  and less than  $L_{\rm u}$ , multiply the constants  $W_{\rm c}$  and  $D_{\rm c}$  by the ratio 30// where  $F_b=33$  ksi.



 $F_y = 50 \text{ ksi}$ 

| $N_{e}$ | S    | D.     |
|---------|------|--------|
| ln.     | In.3 | In./Ft |
| 9.4     | 005  | -      |
| 9.3     | 895  | 1.3    |
| 9.3     | 807  | 1.4    |
| 9.3     | 734  | 1,4    |
| 9.3     | 663  | 1.4    |
| 9.3     | 548  | 1.4    |
| 9.2     | 501  | 1.5    |
| 9.3     | 456  | 1.5 ,  |
| 0.0     | 400  | 1.5    |
| 9.9     | 514  | 1.4    |
| 9.9     | 468  | 1.4    |
| 9.8     | 421  | 1.4    |
| 9.9     | 385  | 1,4    |
| 9.8     | 348  | 1.4    |
| 9.8     | 315  | 1.5    |
| 9.8     | 287  | 1.5    |
| 9.8     | 253  | 1.5    |
| 10.0    | 937  | 1.3    |
| 10.0    | 846  | 1.3    |
| 10.0    | 769  | 1.4    |
| 10.0    | 692  | 1.4    |
| 9.9     | 632  | 1,4    |
| 9.9     | 569  | 1.4    |
| 9.9     | 510  | 1.5    |
| 9.9     | 461  | 1.5    |
| 9.9     | 417  | 1.5    |
| 9.9     | 380  | 1.5    |
| 8.5     | 624  | 1.5    |
| 8.5     | 564  | 1.6    |
| 8.4     | 514  | 1.6    |
| 8.5     | 466  | 1.6    |
| 8.5     | 419  | 1.7    |
| 8.4     | 380  | 1.7    |
| 8.4     | 344  | 1.7    |
| 8.4     | 310  | 1.7    |
| 8.4     | 282  | 1.8    |
| 8.4     | 256  | 1.8    |
| 0.5     | 20   |        |

Notes

 $V_c$  and  $D_c$  by the ratio  $30/F_c$ 



## **MEMBER**

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